NATIONAL MUSEUM OF VICTORIA
R. Pescott

Vol. XXIII. Part 3.

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The Journal of the Department of Agriculture of Victoria, Australia.

March, 1925.

PRINCIPAL CONTENTS

Better Farming Trains

Fertilizers and the Fertilizer Industry

Wheat and Its Cultivation

Herd Test Quarterly Report

Woolly Aphis Parasite

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THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

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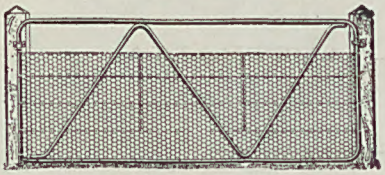

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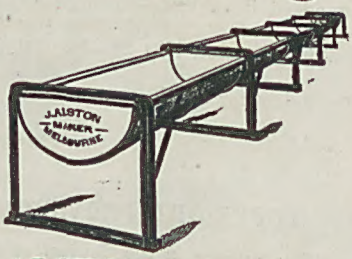

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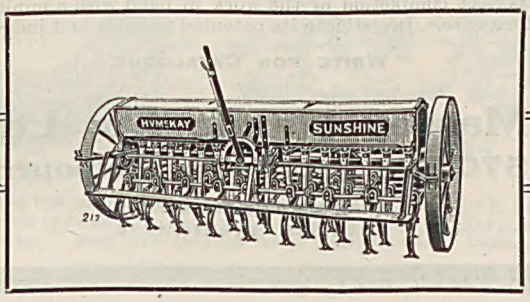

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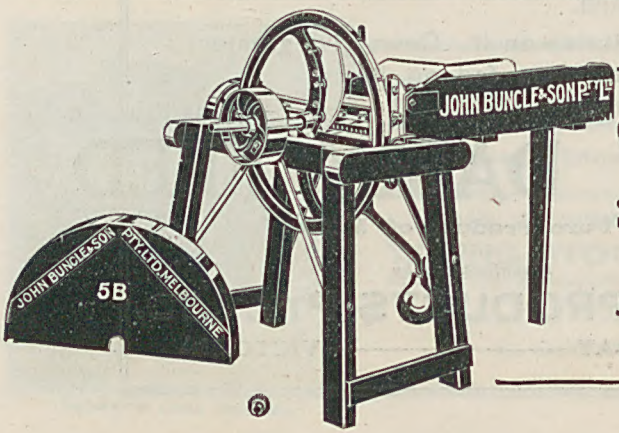

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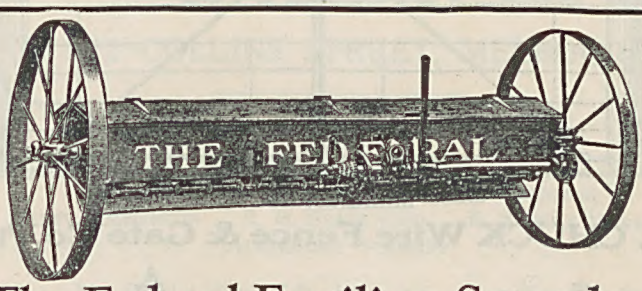

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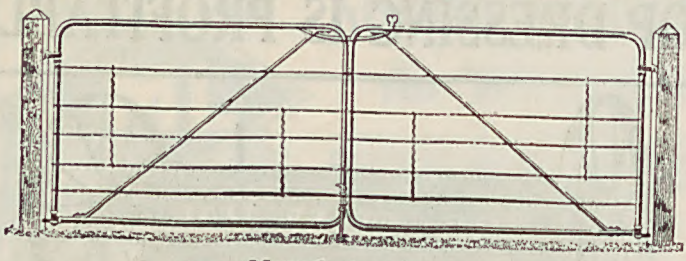

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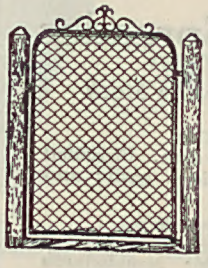

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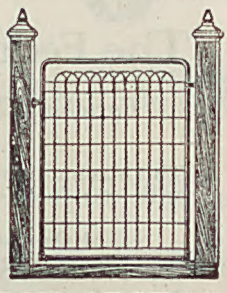

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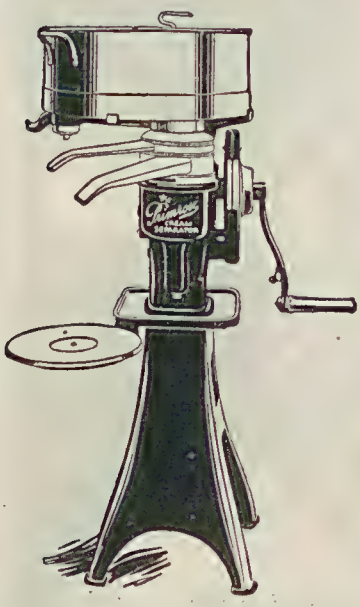

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OF

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Vol. XXIII. **March, 1925.** **Part 3.**

BETTER FARMING TRAINS.

(*Contributed.*)

VALUE AS AN INSTRUCTIONAL MEDIUM.

During October, November, and December, 1924, the Victorian Departments of Agriculture and Railways in association, ran on three tours what was termed a "Better Farming Train." In all, twenty-six railway stations in Gippsland and the Western District were visited. Those centres where demonstrations were given were those in which rural population was densest, or in which railway junctions enabled large numbers of farmers, with their womenfolk, to assemble. The object was to convey information, by lecturettes and practical demonstrations, and so lead to the adoption of better methods, and, therefore, to greater production. Although the idea was not new, such trains having been run in America some years ago, the Victorian train was equipped on a more comprehensive scale than any of its predecessors in other parts of the world. While inevitably, because of its novelty, it was looked upon as a spectacle, the intention was to test the practicability of a Farmers' School of Agriculture on wheels. Some criticism was levelled against the project, both in the city and the country, and strong doubts were expressed as to whether it would achieve anything permanently useful. Men known to be genuinely eager in the cause of agricultural education opposed it. Did the results justify the expenditure involved?

History.

In January, 1924, following on the return from a visit to the United States of America of Mr. M. J. Canny, of the Victorian Railways, he presented a report upon Farmers' Instructional Trains in the United States of America. That report was considered by Mr. H. W. Clapp,

Chief Commissioner of Railways, and Dr. S. S. Cameron, Director of Agriculture, and as a result of conferences, at which the major requirements of the projects were determined on, a committee representative of both Departments, and of the Chamber of Agriculture, was appointed to arrange details. Months were spent in assembling equipment and converting rolling-stock to suit the needs of the school on wheels.

The Train.

The train which eventually steamed out of Melbourne for Gippsland made a striking picture in a green landscape, for all but the engine was painted a rich orange. It consisted of 15 cars and trucks, and was 670 feet long. Each car or truck was numbered.

1. Victoria car for the accommodation of the staff of lecturers.
2. Louvre truck in which electric light was generated, and fodder for the live stock carried was stored.
3, 4, and 5. Cattle trucks specially fitted and divided into three padded compartments for cattle.
6. A "Q" truck divided into six compartments by wire mesh fence for pigs, with outside hinged flap to let down and form a platform on both sides.
7. A "Q" truck, one end of which was utilized as a lecture platform, the remainder fitted with poultry requisites and models of buildings and appliances.
8. A corridor carriage (A.B.), from which all seats had been removed, fitted with tables on either side, leaving a 4-feet passage down the centre with exhibits of good and bad dairy utensils, honey, bacon, testing outfits.
9. An A.B. carriage, fitted with exhibits illustrating disease of stock, and suitable foods and feeding rations.
10. An A.B. carriage, fitted with potato exhibit—varieties, manures, and appliances.
11. An A.B. carriage, exhibiting wool, and various weeds and grasses growing, and also dried specimens, and the mechanical analysis of pasture from top-dressed land.
12. A "Q" truck, specially fitted with sods from dressed and undressed pasture showing actual growth. This truck had platforms to let down on either side.
13. An A.B. car, fitted as a lecture theatre, with seating accommodation for 80 persons, and lantern for illustrating purposes.
14. An A.B. car, fitted with oven, &c., for domestic economy demonstrations, and the necessary appliances for lectures in needlecraft and mother craft.
15. Van fitted with bunks for accommodation of live stock attendants and train crew.

In the centre of each truck or car, with the exception of those devoted to live stock, was a reasonably wide passage to permit large crowds to go to and fro. The lighting, day and night, was excellent, and the original idea of a travelling exhibition was so admirably materialized that it provided a unique spectacle. As a technical school of instruction, for a first effort, it left little that could excite constructive or destructive criticism.

The Train Complete.

The Attendances.

Three distinct tours were made, one to North Gippsland centres, one to South Gippsland, and a third to the Western District. Officers of both Departments made preliminary visits to Gippsland in order to organize interest, mainly by interviewing agricultural societies and shire councils. Judicious propaganda was also circulated through the country press for weeks beforehand. The response exceeded the most sanguine anticipations. At several towns attendances aggregating 1,500 to 2,000 people were registered; in smaller centres up to 1,000 visited the train within a few hours; even for the night lectures the crush was so great that the lecture car could not accommodate all that sought admission. The preliminary organization for the Western District was not so thorough. There was little propaganda, and in districts where the roads were better and the population more congested the attendances were not so large. This fact is significant, for it implies that curiosity must be aroused artificially by adequate publicity. Nevertheless, it is estimated that from 15,000 to 20;000 people, spread over the 26 centres, inspected the exhibits and listened to the lectures.

Types of Instruction.

As it was obviously impossible to carry more than a limited equipment, the organizing committee concentrated, in the preliminary tours, upon dairying, pasture improve-

ment, fodder, potato and tobacco growing, poultry keeping, and last, but not least in importance to the rural community, home economics. If the project proved to be a success, lecturers and material could later on be asembled for cereal and fruit-growing and irrigation districts. Except as they related to fodder or tobacco and potato growing, agricultural material and instructors were not included. The chief officers selected were appointed a committee of management, with Mr. W. A. N. Robertson, B.V.Sc., head of the live stock division in the Department of Agriculture, as leader. Every member of the staff could be described as a practical farmer as well as a teacher and demonstrator. A rigid practicality was considered essential where the period of contact with the audience was so limited. Only one day was given to each centre. The train moved from centre to centre generally in the early mornings.

Upon arrival, the trucks and cars were not disconnected if the station accommodation permitted of that convenient arrangement; otherwise they were separated. Within a quarter of an hour, the cattle were walked out and tied to a fence in the station yard; the sides of the pig truck were let down to enable the farmers to view the animals easily; the side platforms of the pasture plots were lowered, and the doors of all the other cars were opened. The train school was thus quickly in full swing, and, in Gippsland, at least, hundreds of men, women, and children almost immediately entered the train, or made a close inspection of the pasture plots and animals from the platforms. At a prominent point on the station platform a blackboard indicated the order and times of the lectures for the day. It would be advantageous if this time schedule were advertised in local papers beforehand. Farmers living at a distance missed lectures that they were anxious to hear, and the early lectures were not so well attended as those held later in the day. Numbers of the lecturers were surrounded by from 400 to 500 people.

In choosing the subject-matter for a particular district consideration was given to local needs. In all dairying centres addresses were delivered upon the breeding, selection, and feeding of dairy stock, and milk and its products. A veterinary officer gave information upon diseases of animals, officers of the agricultural branch dealt with pasture improvement, and other officers with pig breeding and feeding, cultivation and selection of seed in potato and tobacco growing, and with treatment of wool. In the women's branch attention was directed to infant welfare, cooking, and utility, and decorative designing of wearing apparel. In all cases the equipment on the train enabled the lecturers to crystallize their points by direct illustration—really the central feature of the whole project. After each address, farmers were invited to ask questions, and early in the tours it became evident to the staff that certain subjects interested them vitally. Those subjects were subsequently made important features of the lectures. In that respect the project was educational to the departmental officers in enabling them to meet the needs of the farmers they sought to serve.

Dairying.

Propaganda work as regards dairying was in control of Mr. Robertson, and was carried out by Messrs. R. N. Johnstone, B.V.Sc., R. de C.

Talbot, B.V.Sc., R. T. Archer, J. M. Kerr, A. J. Gill, W. J. Yuill, and G. H. F. Baker. As soon as it became evident that the question which was actively concerning dairymen was the price of butter-fat—in effect, the margin of profit—the lecturers wove into their subject-matter the fact that it is really not so much price as efficient and voluminous production that counts in the profits made from the farm. Costs have undoubtedly risen in greater ratio than prices, but it was shown that extra production per cow, per acre of the farm, and per man on the farm could supply the only permanent remedy. To get extra production it was necessary to get a pure-bred bull from tested cows with good records in butter-fat production. "Abandon," said the officers, "the sale-yard method of herd-building; abandon the scrub bull at once; breed your own dairy heifers from a born and bred butter-fat bull; that is the way to make the industry pay, for a rise in price can afford only temporary relief; it does not reach the crux of the problem."

Demonstration with the Live Stock Carried

At the close of or during these lectures, the Jersey, Ayrshire, Friesian, and Red Poll cattle (bull and cow of each breed) were paraded, and Messrs. Kerr and Gill described their points, their family history, and their big records. They represented families the members of which had butter-fat records ranging from upwards of 300 to beyond 600 lb. a year, whereas the average cow in the State gives only 160 lb. They were proved good producers because their forebears were good before them, and were able to reproduce their own good qualities in their progeny. Mr. Baker followed with a rather handsome, typical dairy cow, of "no particular parentage," with good head and neck, fair quarters, and fair udder, the type that any one would be glad to buy in the sale-yard. She was obtainable in the sale-yard because she was a proved bad producer, her test record in two years being less than 120 lb. a year. Her place—an important one—on the train was to illustrate the folly and risk of being satisfied that a cow is good because she looks good. While dairymen continue to consider such cows

deserving of a farm to run on, they must continue among the lowest paid members of the community.

From these lessons the farmer was led another stage to the means for determining the productive capacity of each member of a herd, and the means which should be adopted in each district to raise the average standard. Mr. Yuill dealt with herd testing, and Mr. Gill gave simple lessons in the use of the Babcock tester. It was shown that the average yields of several grade herds—chiefly in Gippsland—had been increased per cow in two or three years by from 100 to 200 lb. of butter-fat a year just because their owners had been shrewd enough to join a local herd-testing association. In the Stony Creek district of Gippsland, one

Demonstration with Jerseys.

herd tested—in spring gives an average of 13 lb. of butter-fat per week, while a herd on an adjoining farm—not tested—averages only 4½ lb. Fourteen cows from the former group produce a slightly better cheque than 40 cows in the latter, and it is probable that the consumption of food per head is nearly the same. Pedigree bulls which have been tested, the dairymen were told, can be obtained on terms, while young bulls may be purchased at prices within the means of most farmers. Attention was directed to about 70 photographs, hanging on the walls of the car containing foods and rations, each of a cow which had yielded more than 500 lb. of butter-fat in 273 days in the Government herd test. "Bulls from these cows," it was pointed out, "will increase the average butter-fat per cow in your herd by 100 lb. in the first generation. In a herd of 30 cows, this will mean an increased monetary return per annum of £150, with butter-fat at 1s. per lb." Herd test work was referred to as the teaching of the need of a system of better feeding, better breeding, and the elimination of the low-producing cows, so giving a higher value to the dairyman's labour.

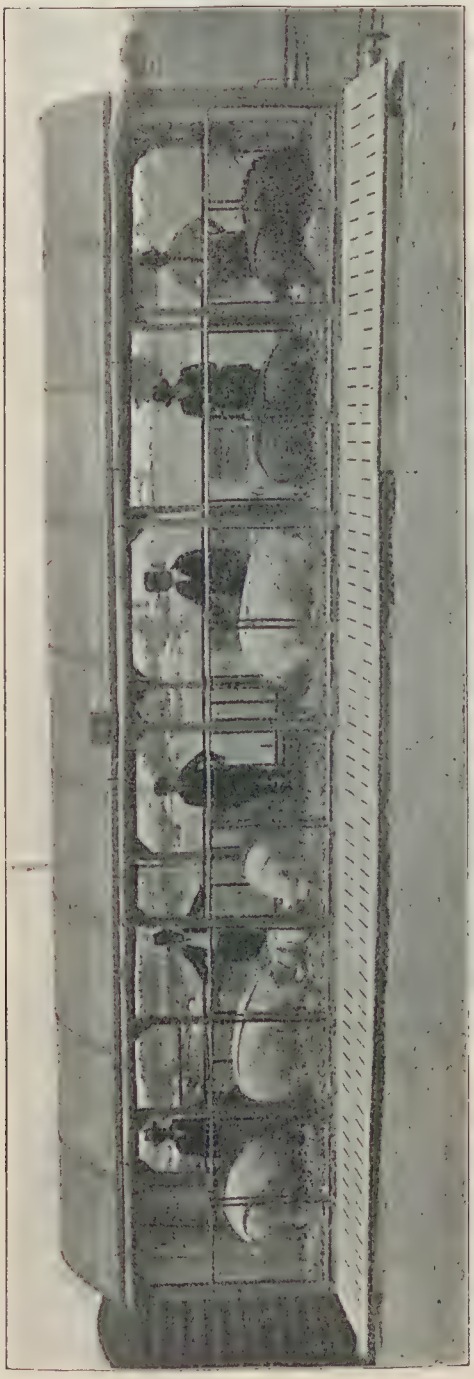
Mr. Archer and others conducted the farmers still another stage to the importance of better feeding. Given possession of the right type of cow, it is necessary to feed her well. Fodder-producing capacity gives farm land its value as such, and good management requires that the cow shall receive throughout the year a continuous supply of food—the raw material of milk—in proper form and sufficient quantity. The heavy producer is given more because she has the means to pay for what she eats. It was shown that vegetable protein in bran costs 3½d. per lb., whereas the extra gallon of milk a responsive cow will give as a result of its use is worth 6d., or with the skim milk, 8d. in all. The profit from feeding the concentrate is consequently 128 per cent.

The Scrub Cow.

In this, as in other branches, it was found that the lectures were merely curtain raisers for the demonstrations and inspections of material that followed. Officers individually were subjected to close questioning upon matter in the addresses which had specially interested the different farmers. Mr. Talbot demonstrated the methods adopted in grading milk and butter. Other officers showed how a multiplicity of utensils on the train could be used efficiently. Each car displayed numbers of slogans bearing upon cleanliness, efficiency in plant, control of disease, feeding, and breeding. There were cream cans which had been condemned, and cans which were recommended for common use; cans covered with gauze to limit chances of entrance of foreign matter; movable covers for buckets; cream coolers, Coolgardie safes, water-heaters, troughs in which to wash utensils, working separators, model

silos, model pig shelter, automatic pig oiler, self-feeders, and the herd-testing equipment. One exhibit showed the difference between poor and good cream. In all districts tests of skim milk were made on the train to show whether separators used by the dairymen were working efficiently, and it is an interesting fact that many of those in the Western District were deficient, while most of those in Gippsland were satisfactory. One exhibit illustrated the varying quantity of milk of different butter-fat percentage required to produce a given quantity of butter-fat. It contained six jars of milk, the tests of which varied from 3.5 to 6 per cent. of fat. Of the milk testing, 3.5 per cent.—14.28 lb.—was required to produce ½ lb. of fat, while with milk testing, 6 per cent. —8.3 lb.—was required to produce ½ lb. Another section illustrated the different kinds of stock foods on the market, and the method of ascertaining their comparative values, and so determine which are the cheapest, allowing for market fluctuations. Yet another exhibit indicated the component parts of 10 gallons of milk, such as the whole milk dried, butter, casein, lactose, albumen, phosphate of lime, and the cheese that could be made. The relative feeding value of separated milk and whey were graphically set out in pounds of pork and veal produced. Two sides of bacon were displayed, one worth 11d., and the other 1s. 3d. per lb.; the former, from an ill-bred pig, was too fat and heavy for the trade; the latter, from a well-bred pig, was fairly lean and comparatively light in the neck and shoulder, where the meat is of the lowest value. Mr. Baker lectured upon the desirable aims of pig-breeders, using as illustrations the live specimens of pure Berkshire, Middle Yorkshire, and Large Yorkshire pigs, and recommended that for the production of choicest quality bacon the Large York should be crossed on the pure sow of either the Berkshire or Middle York breeds, since this was the means of producing the lean, young, juicy, tender bacon so much in demand.

Mr. Talbot had charge of the stock diseases and milk and cream grading sections. Specimens were shown affected with diseases commonly found in Victoria, such as tuberculosis, actinomycosis, contagious pleuro-pneumonia, swine fever, hydatids, liver fluke, and lymphadenitis of sheep. They were prepared to show the tissues in natural colours, so as to make the specimens more valuable from an educational point of view. Alongside were specimens of healthy tissues, so that the farmer might be able to form some idea of causes of sickness or death occurring in his stock, or at least find it easier to give a rough description of the conditions that were present after death. A new method for drenching sheep was demonstrated, and numbers of stock-owners stated that they intended to adopt it. An exhibit of the different proprietary sheep dips was also carried. Yet another exhibit displayed the different bones of horses affected in various stages with ringbone, sidebone, spavin, and splints, and in all cases normal bones were placed alongside the diseased. Here, too, were shown bones that had been fractured, and in which union, complete or otherwise, had taken place; also hoof specimens indicating the result of laminitis, overgrowth, and faulty shoeing.



The Pig Truck with Large Yorkshires, Middle Yorkshires and Berkshires.

Pasture Improvement.

The considerations in the minds of officers of the Agricultural Division, under the direction of Dr. A. E. V. Richardson, in designing the exhibits in the two cars set aside for pasture improvement lessons were to bring out certain salient facts, and, spectacularly, these proved to be among the most effective on the train. The exhibits, with the lectures by Messrs. H. A. Mullett, B.Agl.Sc., and J. Brake, B.Agl.Sc., took the line that Victoria's greatest crop is grass, and that, unlike the wheat-growers, few farmers knew how to produce big yields of it. Yet of all the crops it is the one which calls most for improvement, and in which the returns per acre can be most easily increased. Too little land is sown down to introduced pastures, and much of what is sown is badly in need of renovation. Pastures of introduced and native grass alike are expected to feed animals year in and year out, and still maintain their maximum vigour. All too few graziers realize that by top dressing with phosphate manures they can double carrying capacity in the pasture land south of the Dividing Range, and do it at a cost of a few shillings per acre. Few are familiar with weed pests, and complain about them only when they have obtained a firm hold.

One truck, 36 feet by 9 feet, contained an exhibit

of grass sods dug from the actual top-dressing experimental fields in five centres—Hamilton, Kyneton, Warrnambool, Warragul, and Rutherglen. In all there were 200 square feet of grass in sods 1 foot thick, the total weight being 8 tons. Thus, farmers could obtain what amounted to a bird's-eye view of the more important experimental fields throughout the State, each several acres in extent. They could contrast with un-topdressed pasture the bulk and kind of herbage induced by top-dressing. Were the question asked: "How long an application of superphosphate will

Growing Pasture Plots from Different Fields.

last in the soil?" the answer was written in no uncertain terms in grass and clover. If the information desired was as to whether poor or rich land would respond, the inquirer was shown actual illustrations. The lecturers were armed with evidence of the most convincing kind; they had brought the experimental fields, or at least a portion of them, under the eyes of farmers hundreds of miles away. Each lecture showed how the character as well as the bulk of pasture was increased, and demonstrated on the sods how failure to fertilize encouraged the growth of inferior plants. The sods were the texts.

In the second car were vigorous live specimens of the principal cultivated grasses and clovers, each accompanied by a dry specimen in

the flowering stage. The principal noxious weeds were displayed in a similar way, and both types made attractive window boxes. Farmers could see the plants as they grew in the field, could handle them, and carry away a picture of them in their minds, an invaluable thing in territory where weeds are spreading rapidly. Considerable space was devoted to driving home five predominant facts: (1) That top-dressing produces a greater weight of herbage; (2) that the type of herbage required can, to a large extent, be controlled by the kind of manure used; (3) that the top-dressed pasture is actually richer in phosphorus and lime, which are milk and bone producing elements, and is also richer in nitrogen; (4) that the effect of top-dressing with phosphates lasts in the soil for more than one year; and (5) that top-dressing is a very profitable investment. The results were graphically illustrated in bundles of grass cut from experimental fields. The sizes of the bundles indicated the weight of herbage cut, and, where required, they were sorted out into grass, legumes, and weeds in order to show their

Section Devoted to Stock Diseases and Foods.

composition. Catchy electric signs relating to top-dressing as an investment, and numerous printed slogans were prominently displayed. A comprehensive exhibit of wool and maize was also staged.

Potatoes and Tobacco.

Both in his lectures and exhibits, Mr. J. T. Ramsay, in charge of the potato section, made it clear that higher land values and higher cost of labour rendered it necessary for growers to effect considerable improvements in yields. According to results obtained from numerous investigations conducted by the Department, the main points demanding attention were:—(1) Thorough cultivation; (2) judicious manuring; (3) selection of seed; (4) use of immature seed; (5) proper storage of seed; (6) prevention of disease; and (7) a high standard of grading

(including seed for market). The exhibits were intended to demonstrate practically how these points can be economically adopted with little increase in expense or work. There were staged:—(1) Correct types of commercially grown varieties; (2) seed correctly stored and otherwise; (3) the results obtained from the use of immature as against ripe seed; (4) the results obtained from the use of selected seed; (5) the results obtained from various manures; (6) specimens of disease and prevention methods; (7) standard of grading, desirable and otherwise; (8) cheap and effective method of quick grading; (9) model of boxes in dipping trough; and (10) model of wooden pit, with glass side, showing effect upon growth of pitting.

Mr. Temple Smith, Tobacco Expert, confined his attention to the Gippsland tours. He holds the opinion that there is a large area of land in Eastern Gippsland suitable for the production of good tobacco. Already excellent specimens of leaf have been grown on experimental plots on the upper reaches of the Tambo River, at Buchan, and in several other localities well back from the coast-line. As crops can be produced on cheap land at a profit of from £75 to £150 per acre, an effort should be made to establish the industry in those sections. Exhibits of suitable appliances, including models of curing barns, were staged, as well as types of leaf to aim at, bales ready for market, and bales in the making.

Poultry Keeping.

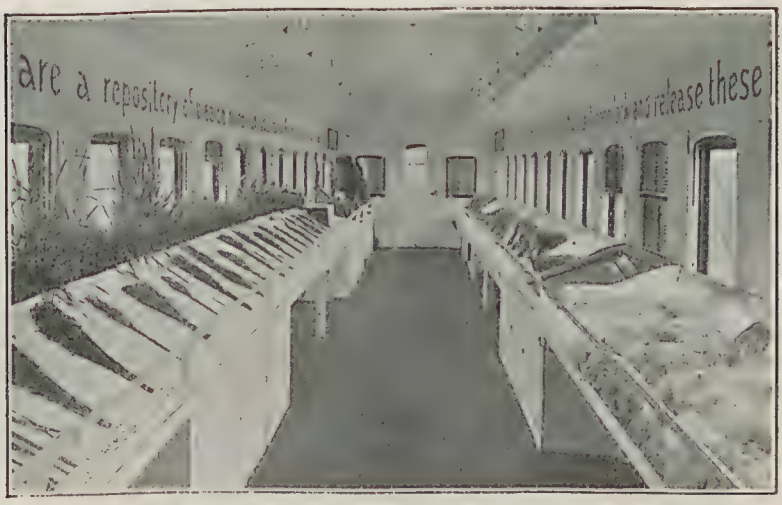
Just as farmers should keep only the best animals, so also they should give pen-room only to pure-bred poultry, because they are more profitable than mongrels. This point was stressed by Mr. W. C. Rugg, whose appeal for better methods was backed entirely by actual results obtained at the Werribee Research Farm, and was singularly free from the flamboyancy in which numbers of poultry experts indulge. "At Werribee," he said, "a cockerel bred from a hen which laid 110 eggs in twelve months, and whose father was bred from a hen which laid 93 eggs, was mated with two hens (mother and daughter), whose records were 269 and 273 eggs respectively. Ten pullets from this union averaged only 153 eggs in a year. Another cockerel, bred from a hen which laid 272 eggs, and whose father was bred from a hen which laid 275 eggs in ten months, was mated with six hens whose records were 7, 59, 96, 109, 130, and 159. Thirteen pullets from this union averaged 184 eggs per bird in twelve months, and four daughters of the hen which laid 96 eggs produced upwards of 200 each in the twelve months. Thus, pedigree males are the only safe ones to use. Fowls should receive a variety of food, and the type should be governed by price." Mr. Rugg indicated type of egg to aim for, type of crates to use when marketing both eggs and live poultry, type of poultry to market, and staged numbers of simple contrivances, including a model poultry pen and self-feeders.

Home Economics.

It was a happy and logical idea to include sections relating to home economics, and, in Gippsland, at least, no branch of the train was better

supported. It is possible, too, that the women were more eager than the men in the search of useful information. They took a keen interest in other sections, and were frequently heard recommending their husbands to acquire labour-saving devices or utensils likely to lead to higher-grade production.

Sister Peck, Principal of the Victorian Baby Health Centres, was kept extremely busy. On the North Gippsland tour, it is estimated that no fewer than 2,000 women attended her lectures, while in South Gippsland an aggregate of about 1,200 attended. Each lecture was really a demonstration, practice being combined with theory. She dealt with the care and clothing of infants, the most useful clothing materials, the making and washing of garments, and the care of food, emphasis being laid on the possible trouble arising from failure to keep common commodities such as milk and sugar covered from flies. After the lectures



Wool, Weeds, and Pasture Exhibit.

she was called upon to answer questions upon subjects not included in the addresses.

On the first trip, Mrs. Storer, and on the subsequent ones, Miss E. Coxon, who holds a diploma in Domestic Science, and is in charge of a needlework centre in Melbourne associated with the Department of Education, showed how to measure, draft, and cut out simple patterns for garments that are at once useful and decorative. In illustrating values of different materials, they demonstrated that price is not the main criterion. A box of samples containing such varied articles as aprons, knitted frocks, embroidery work, on the one hand, and riding pants and tailoring designs, on the other, aroused a great deal of interest, and it was not uncommon for 150 women to be crowded into the comparatively small lecture car at one time. In numbers of centres, senior girls from the schools attended for instruction.

On the first tour, Miss Pell, Supervisor of Domestic Arts, gave demonstrations and lecturettes in simple cooking, with special consideration to dried fruits, soups, casseroles, re-cooked meats, fish, pastry, and scones. On subsequent tours, Mrs. Melville, of the Domestic Arts School, was in charge of this section. Perhaps, of all the subjects, pastry making was the favorite. A medium-sized stove, with wood for fuel, was installed.

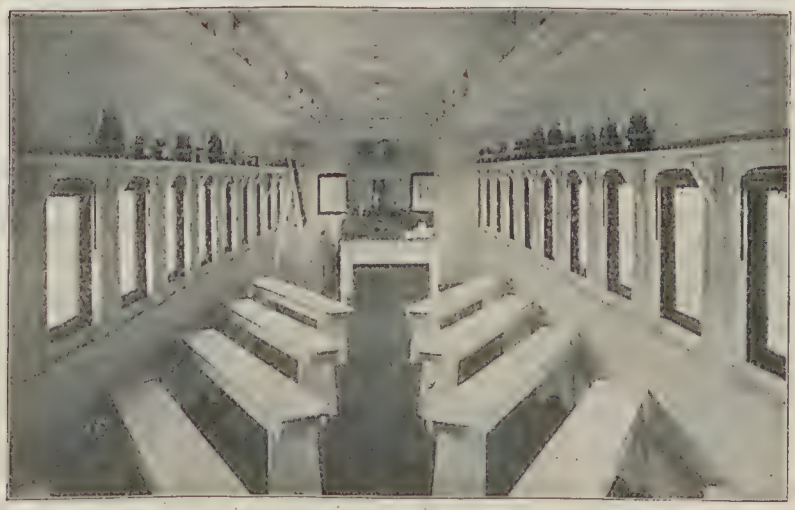
Evidence of Value.

The outstanding feature in this form of instructional activity, observed early in the itinerary, is that a Better Farming Train reaches people who would not attend extension lectures, agricultural classes, and short courses for farmers, and would not read bulletins. The novelty of the idea—a spectacle—aroused their curiosity. They were eager to see a train painted a rich orange, a school of agriculture on wheels, a travelling experimental field, and lantern slides, and, despite themselves, they became strongly interested in the lessons taught. There was another type, the staid, well-to-do men, who wished to determine whether this new way of spending public money—their money—was justified, and many of them frankly admitted that they attended with a prejudice, and ready to condemn. But in whatever spirit they came, most of them found that they could learn something useful to them. A member of committee of the Maffra Agricultural Society was so prejudiced that he did not visit the train when it was in his district, but the reports of his friends were so enthusiastic that, a few days later, he drove a long distance to see it for himself, and subsequently voluntarily admitted at a committee meeting that he had spent a most instructive day, that, in short, the train had realized its aims. There was a large body of men and women who were genuinely anxious to get information, and who attended with that object. As a rule, the women were more ready to admit how eager they were than the men. One housewife told Sister Peck that she had risen at 3.30 a.m. in order to milk the cows and get the children ready, so that she could drive between 30 and 40 miles to be on the train for her lectures. Sometimes the lady lecturers were embarrassingly surrounded by housewives making protestations of gratitude. One girl said to Mrs. Melville: "You have just shown me something that I have wanted to know for a year."

But the men were not lacking in appreciation or gratitude. Mr. Yuill asked farmers in Gippsland what they thought of the train. "Without exception," he reports, "these men said that the only thing wrong with it was that it did not stop long enough for them to take in half of the information afforded." "People seeing the train throughout the day," reports Mr. Gill, "frequently came back in the evening to express their thanks. On the return journey from Gippsland, a farmer came a long distance to express thanks to the Department for the trouble taken to teach his son how to test milk, and added that he had purchased an old testing machine from a neighbour, adjusted it, and had commenced to test his cows." In this case, it is reasonably certain that the evidence he will acquire will lead to greater production from his herd and his farm.

Reports from officers note numerous similar examples of successful instruction. Farmers obtained direct information concerning samples of local lime deposits, samples of bone dust, pests, and diseases, drainage, manuring, and, as a result of personal inspection, how to renovate worn-out pastures.

Mr. Mullett reports:—"A feature of the visit to each centre was the number of plant specimens handed in for identification and advice. In all many hundreds were identified, and several plants hitherto unrecorded were brought to light, including Heath Grass (*Steiglinia decumbens*). This plant was discovered by Mr. F. N. Johnston, of Meeniyan, growing on some poor heath land in the district, and may prove of value for improving the carrying capacity of a similar type of country. The specimen of Hoary Cress carried on the train led to the discovery of this weed in the Maffra district, and steps are now being



Domestic Economy Car (with Range at Back.)

taken to prevent its spread. Had the infestation been allowed to assume extensive proportions before its discovery, serious loss may have been caused to the farming industry at Maffra, including beet-growing. It is apparent that farmers have many problems upon which they do not seek advice, and one effect of the train has been to stimulate their desire to have those problems solved." In the Mount Rouse Shire a specimen of wort, another dangerous pest, was identified.

Mr. Talbot reports: "From the number of questions asked on the subject, it appears that one of the most serious diseases which the dairy farmers have to contend with is Mastitis. A great many of the Department's bulletins on this disease were given out at each town visited, and the fact that the disease is in most cases contagious was stressed. In the sheep districts foot rot and intestinal parasites seem to be more prevalent this year than is usually the case. Large numbers of sheep-owners were given advice on these two subjects."

Mr. Yuill reports: "The farmer's attention can be secured when his pocket is touched. The grading down of inferior cream has made men anxious and prepared to investigate means of overcoming causes of low-grade cream. The need of better-grade milk is similarly interesting men in milk areas. There is undoubtedly a turning to the Department for assistance. This was specially manifest in Gippsland, where men followed the train for the second day, and expressed the hope of again seeing it at a future time. Inquiries were received as to the use and construction of silos and the making of silage. Great interest was taken in the herd-testing equipment, and already associations are being organized at Newry, Maffra, and Glengarry, while Sale and Gormandale are likely to establish similar bodies as a result of the visit of the train."

Mr. Gill reports: "Numbers of farmers, after seeing the demonstrations of the operations of cream coolers, announced their intention to purchase plants immediately. Some farmers had not been obtaining the best results owing to the fact that they had been running the water through in the wrong direction, and expressed their gratitude when the correct method was explained to them. At Heywood, two boys, after hearing the lectures, persuaded their father to order a pure-bred bull and two pure-bred heifers. Later, they coaxed him to follow the train to Hamilton, and after a second hearing of the lectures, they induced him to cancel the first order for a bull, and purchase a more expensive animal with heavier production behind him. I feel sure that, during the next twelve months, large numbers of pure-bred bulls will be introduced into herds hitherto possessing only scrub bulls. In the conversations with us afterwards, the following questions were frequently asked: "Will it pay to feed concentrates? How long should a bull be kept on a farm? Is it safe to use him on his own progeny? Will feeding affect the test of milk? How to feed cows and pigs, the best ways to conserve food, and the best varieties of fodders?"

Mr. Kerr reports: "Notwithstanding all that the Department has spoken and written concerning better methods in dairy farming, the attendances at the train embraced a preponderating number to whom the advice was new. This shows clearly that lectures in the towns and articles in the *Journal* do not reach a great proportion of the class they are designed for. Before the institution of the Better Farming Train, there was nothing in the attitude of the farming community in the districts concerned to show that they greatly desired instruction in farm practice; in fact, the impression forced upon one was that they were quite indifferent. This could not be said of the class of men who attended the train at the different centres. Numbers appeared to be surprised that there was such a thing as a science of agriculture, and quite unaware that there was any advocacy anywhere of farm practices other than those they had learned from their fathers."

Hundreds of babies were submitted to Sister Peck for advice. Some of them were suffering from skin rashes, and measures to overcome diatetic troubles were explained. It is interesting as illustrating the instinctive generosity of the farm woman to be able to report that most of the infants were suffering from overfeeding. Sister Peck makes the comment that many city babies are underfed, while many in the

country are too liberally treated. Information was given regarding better feeding methods, and scores of leaflets and diet sheets were distributed. After the tour, Sister Peck received dozens of letters from women with whom she had come in contact asking for further information. Miss Coxon mentions cases where women, who had closely watched her demonstrations in garment making, later visited the train at other centres to display their efficiency in following her instructions.

Apart from the identification of useful and noxious plants, perhaps the best direct evidence as to the value of the train was in the active interest shown in the organization of herd-testing associations. But there was other direct evidence. Arrangements were made during the tours for the purchase by dairymen of 25 pure-bred bulls, the parents of which had been tested. Stud men have also received numbers of inquiries about others. Savings of produce have been effected in the use of separators. Advantages will be gained because of the acquisition of better utensils, and the sterilization of them in order to improve the grade of cream sent to the factories, and, inevitably, to get a higher price. Numbers of dairymen will undoubtedly feed their herds on a more rational basis, because they have learned that by the expenditure of 6d. they can increase the amount, and therefore the value of the produce, by 1s. In such cases, 2 lb. of butter-fat will be produced where there was only one before.

If 25 farmers who visited the train in each centre took away only 25 per cent. of what they were told, the expenditure involved will be more than worth while. If only five men in each district are converted to the benefits of herd testing, and determine to start an association, they will react upon about 21 others in their neighbourhood. No fewer than 1,000 cows will be involved. In the course of twelve months, these men may find that 25 per cent. of their cows are not paying them, hence they will cull them. They will seek others to replace them, and will also acquire a knowledge of the value of pure-bred bulls and of better feeding. In two or three years the average standard of their herds may be raised from, say, 150 to 250 lb. of butter-fat a year per head. That will mean 100 lb. extra from each of 1,000 cows, or, valuing the fat at 1s. a lb., a total increase to State wealth of £5,000 a year from one of the 26 centres visited, and from one only of the industries in that centre.

Many townspeople displayed keen interest in the lectures and exhibits, and, as business men, recognized that a general adoption of the lessons taught would be as beneficial to themselves as to local farmers. In future, they are likely to be active propagandists, and may exert useful financial pressure to assure greater production.

A feature that interested the class which attended the train out of curiosity, and which was frequently commented on by them, was that the departmental officer was not a superior being who was unapproachable. The average officer took the attitude that he was there to learn by an interchange of ideas with the man on the land. He quickly proved that he was sincerely anxious to help, and quietly discuss problems of importance. Theory was almost entirely eliminated from the lectures. The language and illustrations of the lectures were such

that they could be easily understood. On one occasion, an officer considered it necessary to explain the reason why the cow required certain foods, and entered into a description of the functions of protein, carbohydrates, and fat. Within two or three minutes the observant spectator could see a decline in interest, and one and another of the audience found an excuse for moving away. Years ago, ability to deliver a string of technical or scientific terms was the hall-mark of the agricultural expert. That day has gone, and because it has gone, officers do more effective work. The train enabled officers to study the needs of rural people in numbers of districts comparatively new to them, and thereby they can formulate plans for helping them. It has been shown that the case as put to the farmer by officers was greatly strengthened by the practical illustrations available in live animals, utensils, and growing plants. The eye informed the mind, and because of that, the Better Farming Train is probably a more efficient instrument of instruction than the agricultural classes conducted in rural centres by the Department in pre-war days.

Defects.

Of course, it cannot be claimed that the train is an ideal medium. Necessarily, perhaps, too much is done in one day. The farmer hears and sees more in a few hours than he can possibly take away. He is apt to get points of vital interest to him in the wrong perspective; in fact, Mr. Robertson was more than once asked for an explanation of statements the officers were believed to have made, but which they had not made. The farmers had got points tangled with their own preconceived ideas. The instruction is not sufficiently continuous. The question of having sectional trains is worthy of consideration, say one for dairying exclusively, and one for cultivation exclusively, or, failing that, to give two days to each centre. More time for certain important subjects is required, and more publicity essential. Time schedules for lectures should be published in local newspapers beforehand.

Conclusions.

The points made may be summarized:—

1. The Better Farming Train reaches a large body of men and women who would not attend agricultural classes or read departmental bulletins.

2. It has proved an educational factor among people who were attracted to it by mere curiosity.

3. The comprehensive equipment carried gave a practical direction to the addresses by officers, and enabled the farmers to more easily understand the instruction tendered.

4. It was educational to officers, and so popularized the Department of Agriculture that more demands will be made upon it for help.

5. It has realized its chief objective—encouragement of better methods—and increased production in 26 centres should result.

6. Twenty-five pure-bred and tested dairy bulls have been ordered, and inquiries forwarded to breeders for others.

7. Already three new herd-testing associations are being organized, and two others are likely.

8. Plant has been acquired that will lead to the marketing of higher grade products, and that will be labour-saving, so tending to reduce costs of production.

9. Savings of cream will be effected in the working of separators.

10. Dangerous weed pests were identified and information given concerning their control or suppression.

11. Information was given regarding the control of stock diseases.

12. Grazing areas are likely to be more productive because of information given concerning the value of top-dressing pastures.

FERTILIZERS AND THE FERTILIZER INDUSTRY.

(Continued from page 73.)

By P. Rankin Scott, Chemist for Agriculture, and Will C. Robertson, Supervising Analyst.

SUPERPHOSPHATE—*continued.*

Rock Phosphate.

The Nauru and Ocean Island deposits of rock phosphate, while being the only deposits of practical importance to the Victorian farmer at the moment, must not be regarded as the only deposits of calcium phosphate in existence. Tri-calcium phosphate, commonly called phosphate of lime (a term which is technically incorrect), is a combination of lime and phosphoric acid in definite proportions. It is practically insoluble in water, distilled water dissolving from a trace to .01 per cent. It occurs extensively as the mineral apatite, generally as pale green crystals which are fairly hard, and have a vitreous lustre. Clean specimens contain more than 40 per cent. of phosphoric acid, but usually, in Victoria for example, the mineral is largely associated with the matrix. Deposits have been worked in Canada and Norway, and small patches have been discovered in the various volcanic areas of Victoria.

Phosphatic minerals, such as wavellite (phosphate of aluminium), vivianite, and dufrenite (phosphates of iron) are known to exist in fair quantities in Victoria in situations environing the Great Dividing Range. The deposits are of low grade, however, and under existing methods of fertilizer manufacture, apart altogether from the cost of mining and transport, these phosphatic minerals are of small importance, and are only mentioned in connexion with a new process of phosphoric acid manufacture—the volatile method—which will be described subsequently.

Enormous deposits of tri-calcium phosphate (rock phosphate) of varying quality are being worked in several places scattered over the face of the globe, while many deposits have become exhausted, and others have not proved economical. In England and France, deposits of low-grade tri-calcium phosphate, nodular in form, and termed "coprolites," were the first natural deposits to be worked for the production

of superphosphate. The discovery of the more extensive, cheaper, and better quality phosphate deposits has rendered the "coprolite" fields a thing of the past. They have served their useful purpose, and are now cast aside. Coprolites are of marine origin, and owe their formation to the fossilization of bones, teeth, and probably the intestines and excrement of fish.

Low-grade amorphous deposits of tri-calcium phosphate exist in Belgium, and on the Somme, in or associated with deposits of chalk. Although of inferior quality, they have one practical advantage, viz., they do not require grinding, and are amenable to concentration by dry blowing or air flotation. The value of the deposits is only local at present, although fair parcels are sent to England to be used as a diluent in certain mixed fertilizers.

In the United States of America, notably in South Carolina, Tennessee, and Florida, large deposits of phosphate rock* (tri-calcium phosphate) occur. They are worked extensively, and are the basis of the superphosphate trade in America and on the continent. The deposits in South Carolina and Tennessee are of inferior quality (50-60 per cent. tri-calcium phosphate), whilst the Florida "pebble" or "hard rock" phosphates contain from 70 to 80 per cent. of tri-calcium phosphate, and are the main source of supply.

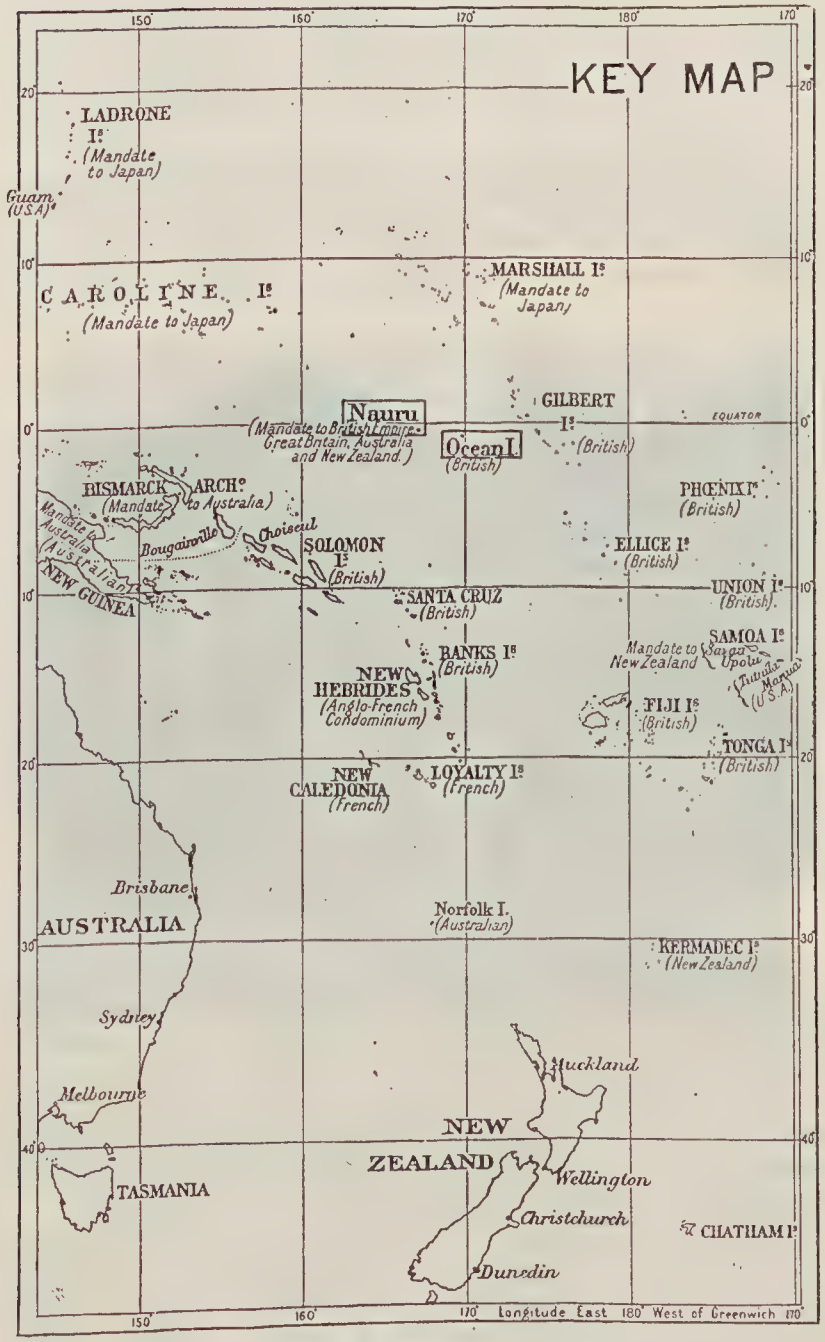
Phosphate deposits also exist on several of the West India islands and in Africa, but not in any great quantity, the deposits, for the most part, having become exhausted.

ORIGIN.

Reverting to the origin of rock phosphate deposits, it is generally believed that those of inferior quality, such as the coprolite fields of England and France, are of marine origin—metamorphosed remains of fish and their excrement. In the case of the deposits of better quality such as those of Nauru and Ocean Islands, the probabilities are that in former times the islands were much higher above sea level than at present; at any rate, certain of the high peaks on the islands were utilized as rookeries by numerous sea-fowl. Over a period of years in the tropical climate, the accumulation of droppings, refuse, fish food unfertile and broken eggs, the feathers and bodies of birds, young and old, gradually built up a bed of amorphous material, to which is given the name guano.

As the years rolled on, more and more guano was formed, and incidentally tropical rains, probably few and far between, leached out the soluble portion of the guano—mainly the salts of ammonia and phosphoric acid (with a fair proportion of a combination of both, viz., ammonium phosphate) from the surface of the deposit, and through it on to the underlying strata (limestone rock). The insoluble part of the guano (calcium phosphate) remained as a powder, but there was an appreciable amount of double decomposition between the leached solution draining from the deposit and the limestone rock underlying, which resulted in a further quantity of rock phosphate (calcium phosphate) being formed. Being insoluble in water, subsequent rains had little or no effect upon the calcium phosphate remaining.

* Phosphate rock may be regarded as tri-calcium phosphate for the purposes of this article.



The Pacific Islands.

The ammonia may have drained away to the lowlands, or may have been volatilized, and poisoned the atmosphere, and driven the birds away, or possibly may have caused an epidemic. This action may have gone on for countless ages. Then probably an earthquake, or perhaps an upheaval in another place resulted in the altitude of the islands being considerably lowered.

On the advent of man, centuries afterwards, the deposits were discovered, 30 or 40 feet in depth, and so thoroughly leached that all trace of guano had disappeared. The deposits occur to-day as high-grade phosphate of calcium, containing up to 88 per cent. of tri-calcium phosphate, which is equal to approximately 40 per cent. of phosphoric acid.

Railway Lines Branching Off Main Line into a Nauru Phosphate Field.

A Word on Guano.

This concentrated natural organic fertilizer was introduced into England from Peru as far back as 1839, and it immediately took first place among concentrated fertilizers. The original deposits came from the Chincha Islands, but these have long since become exhausted. Small amounts of guano, however, are at present finding their way to the continent from this locality—the islands having again become "guaniferous" owing to a protection policy whereby the birds are specially preserved with a view to the formation of fresh guano. For the same reason deposits may also be formed on the rainless coast of Peru.

The original guano contained up to 14 per cent. nitrogen, mostly as soluble ammonium salts, 13 to 14 per cent. of phosphoric acid, the greater portion of which was readily soluble, and 4 to 6 per cent. of potash as potassium sulphate, also readily soluble in water. As the guano contained appreciable quantities of organic matter in a condition favouring rapid decomposition to form humus, one can easily

credit the remarkable results obtained from applications to the soil of such an evenly balanced, soluble concentrated fertilizer. A small amount of what is termed "dissolved Peruvian guano" is annually imported into Victoria. This will be dealt with under a separate heading subsequently.

No "bird" guano has been discovered in any of the islands close to Australia, nor is any ever likely to be, but there are small patchy deposits of "cave" or "bat" guano occurring in North Queensland and the islands off the coast of Western Australia. These deposits, formed from bat excreta, &c., are small and of low quality, and therefore are of little commercial importance.

Sources of Supply.

From the details given in the foregoing pages the reader will glean that the sources of phosphoric acid as a raw material are (1) bones,

At Nauru—A Worked-out Field in Foreground, and New Field with Overburden Removed and Ready for Working.

(2) minerals such as apatite, wavellite, &c., (3) phosphate deposits, the result of the changes wrought by Father Time on the remains of fish and sea-fowl. It may be concluded that bones as a source of raw material are out of the question, both from the stand-point of supply and cost. As far as the mineral deposits are concerned, even assuming that extensive deposits of calcium phosphate as apatite were discovered, mining costs and transport charges are such that with present methods of manufacture their use would be prohibitive.

Under the third heading we have phosphate rock deposits as a source of supply for the essential phosphoric acid, and from these deposits superphosphate is manufactured, not only in Australia, but the world over. Australia, however, is mainly interested in the deposits

of the Pacific Islands—more particularly those of Nauru and Ocean Islands.

The deposits are worked by Chinese "coolie" labour, the phosphate being dug out by hand, and carted to trucks, and thereby carried on a tram line to the drying plant. After the surplus water is driven off in the "driers" (the idea being to save freight), the "dry" phosphate is transferred in bulk and loaded on to the ocean-going vessel, which is moored outside the barrier reef surrounding the island. The "phosphate" vessels carry from 6,000 to 9,000 tons of rock phosphate per trip, and those coming to Victoria discharge their valuable cargo either at the wharf at Yarraville or North Geelong. The present output of superphosphate in Victoria requires at least one boat per month to transport the raw material necessary.

Railway Line Through Part of a Worked-out Field at Nauru.

It is not to be inferred that regular monthly sailings are effected; as a matter of fact the task of loading the rock phosphate in the Pacific Ocean is an entirely different proposition from unloading it at Yarraville. When loading, the custom is to "make hay while the sun shines," and as much phosphate as possible is loaded while the weather is good, and the vessel steady at her moorings, for there is no knowing when adverse weather conditions will render loading impossible, and the ship will then have to "stand by" at sea. Consequently, each superphosphate company carries large reserves of rock phosphate, a fact which should not be lost sight of, for reserves of raw material represent "dead" money, i.e., money which eats up interest.

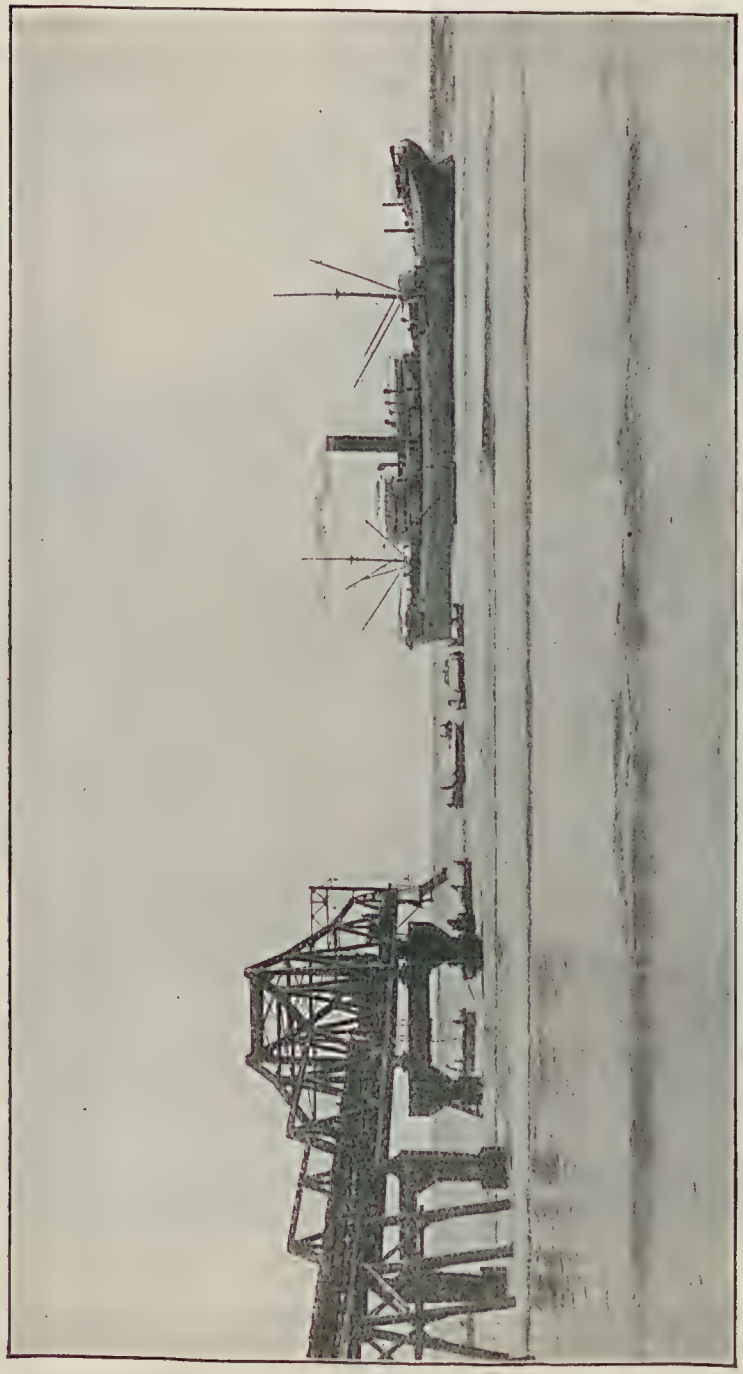
The difficulties in the way of a regular supply of rock phosphate are to a certain extent being surmounted, but only at an enormous cost, which, of necessity, has to be debited against the unit price of phosphoric acid in the phosphate, and is reflected in the price of the finished article. Were it not for the heavy capitalization necessary at the islands, the price of rock phosphate would be lower than it is, yet, by the same

token, when certain large proposed improvements are made, the cost of the rock will decrease.

To make this clearer, let us say, firstly, that the heavy expenditure involved in gathering the rock phosphate on the isolated islands of the

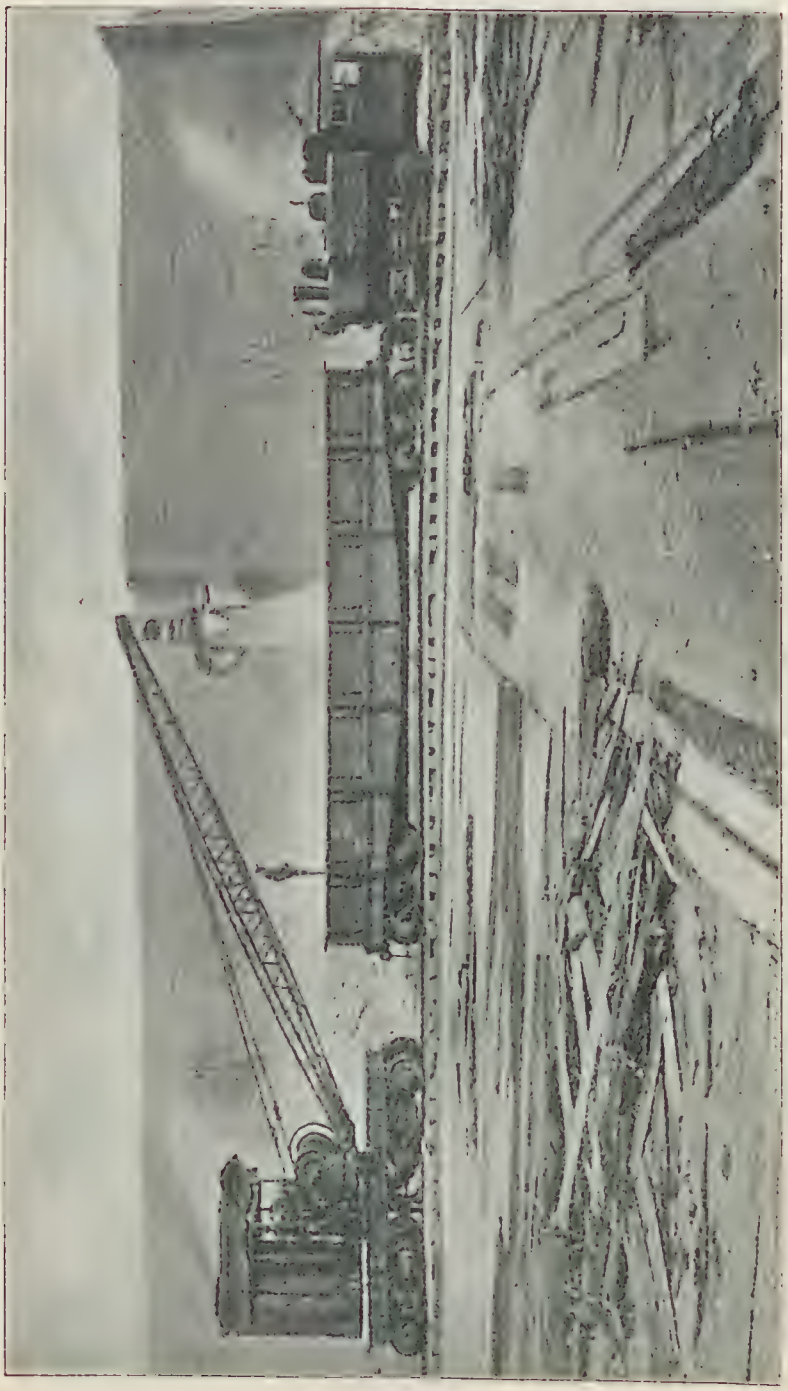
A Corner of a Particularly Good Field at Nauru, Showing Portion of one of the Covered-in Areas, which are Worked in Wet Weather.

Pacific, with the attendant difficulties of loading, &c., regulates the price of the raw material, and, secondly, if further capital is obtained to facilitate loading, &c., economies will be effected which will be reflected in the price per ton of rock phosphate.



A Vessel Loading 6,000 Tons of Phosphate at Nauru for Shipment to Australia.

Sulphur Extraction, Louisiana, U.S.A. (Note molten sulphur in foreground.)



Loading Sulphur, Obtained by the Frasch Process, into Truck—Louisiana, U.S.A.

Raw Material.

Sulphur.

Until 1903, 95 per cent. of the world's supply of sulphur came from mines in Sicily. The method of extraction is simple. The ore containing the sulphur, the percentage of which varies between 30 and 40 per cent., is mined and raised to the surface by mechanical means. It is extracted by heating the ore above the melting point of sulphur in specially constructed furnaces, whereby the molten sulphur runs out and is collected in moulds to cool.

The successful application of the Frasch process—which is probably the greatest triumph in modern chemical engineering—has placed the United States of America in a dominant position as regards the production and supply of sulphur.

As a matter of fact, the supply of Sicilian sulphur is rendered commercially possible only by an arrangement recently concluded between the sulphur interests of America and Sicily, whereby Sicilian sulphur can be realized at a reasonable price.

The Frasch process consists of a series of five pipes inserted one within the other, and driven down to and through the sulphur bed. The outer pipe is 13 inches in diameter, the next is 8 inches, and encloses a 6-inch pipe; inside this 6-inch pipe is placed one of a 3-inch diameter through the centre of which is a pipe 1 inch in diameter.

Super-heated water is consistently pumped down the 6-inch pipe. The sulphur melts at the bottom of the bed, and is forced, in the molten condition, up the 3-inch pipe to the surface by means of compressed air (air lift), and conveyed by the smaller 1-inch pipe which runs down the centre. When the molten sulphur reaches the surface, it is conducted by a series of pipes to enormous bins, where it solidifies.

The sulphur beds of Louisiana and Texas are associated with oil and rock salt beds, the sulphur deposits being discovered when boring for petroleum is being done. They occur at a depth of 400 or 500 feet, and average over 100 feet in thickness.

For many years after the discovery of the beds in 1865, attempts were made to win the sulphur by mining operations, but all attempts had to be abandoned owing to the geological formation of the country rendering mining unsafe. The prevalence of obnoxious and foul gases also was responsible for the many disasters.

In 1891, Frasch—a German chemist— appeared on the scene, and finally, after much hard study, launched a company which worked with wonderful results the process already described. The efficiency is very high, and the sulphur produced is practically pure. The production from the Louisiana fields is regulated to meet the supply, but the annual production exceeds 250,000 tons. It is computed that the sulphur-beds contain not less than 40,000,000 tons of sulphur, and that the Frasch method of extraction has made available 20,000,000 tons of the element, worth roughly, £90,000,000—all made possible by one man's discovery. It is worthy of remark that the Sicilian deposits are computed to contain a similar quantity of sulphur reserves, and these deposits have been supplying industries for over 300 years.

(*To be continued.*)

WHEAT AND ITS CULTIVATION

(Continued from page 12.)

By A. E. V. Richardson, M.A., D.Sc., Director, Waite Agricultural Research Institute, South Australia, late Agricultural Superintendent, Victoria.

Relationship between Wheat Yield and Rainfall.

A close relationship exists between the average yield of wheat and the rainfall during the growing period of the crop. The dependence of the wheat yield on the rainfall is very clearly shown if the wheat yield in bushels per acre for any of the wheat-growing States is plotted against the composite seasonal rainfall of that State. If such a comparison of average wheat yields with seasonal rainfall be made over a sufficient number of years, the influence of low and high seasonal rainfalls on crop production is clearly shown, as well as the optimum seasonal rainfalls for heavy yields. At the same time such a comparison gives a fairly reliable method of estimating the progress of wheat-growing methods in the State.

In order to determine the relationship between the wheat yield and the seasonal rainfall for Victoria, the rainfall for the period April to October inclusive was taken for a period of 30 years at ten representative centres in the wheat belt. These centres were:—Mildura, Ultima, Beulah for the Mallee, Nhill, Horsham, Donald for the Wimmera, Shepparton, Bendigo, and Echuca for the northern areas, and Rokewood for the Western District. The Mallee, Wimmera, and northern districts each produce on an average 30 per cent. of the total wheat yield of the State, whilst the western and central districts produce the remaining 10 per cent. The composite average seasonal rainfall at these ten representative wheat-growing centres may be taken as equivalent to the average seasonal rainfall for the wheat belt of Victoria. It is a well recognized fact that rainfall is the limiting factor to wheat production in the Australian wheat belt. In Victoria and South Australia, approximately 75 per cent. of the total yearly rainfall is received from April to October, which coincides approximately with the growing period of the wheat crop. In the drier districts of South Australia and Victoria, wheat ripens towards the end of November. Rains in November are usually very light, and have only a slight effect on the wheat yield. Heavy rains during September have the most pronounced effect on yields, for the wheat is then approaching its period of maximum transpirational activity, and shortages of soil moisture at this stage greatly depress yields.

The normal seeding season for wheat extends from the middle of April to the end of May. In some districts, e.g., northern areas of South Australia and Victorian Mallee, earlier sowing is practised; whilst in other districts, and notably on the black clay loams of the Wimmera, seeding is much later.

Under normal conditions, the Antarctic rains, which govern wheat production in Southern Australia, begin in April and end in October. Rain falling in April is readily held by the soil and is available for the young crop sown later. Rains in November, however, are of little use to the wheat crop except in late districts and in abnormally cool seasons.

For the State as a whole, therefore, the average rainfall during the growing period of the crop may be considered as practically equivalent to the rainfall for April to October inclusive.

The composite average seasonal rainfall for Victoria for a period of 30 years is 11.59 inches. The average wheat yield for this period is

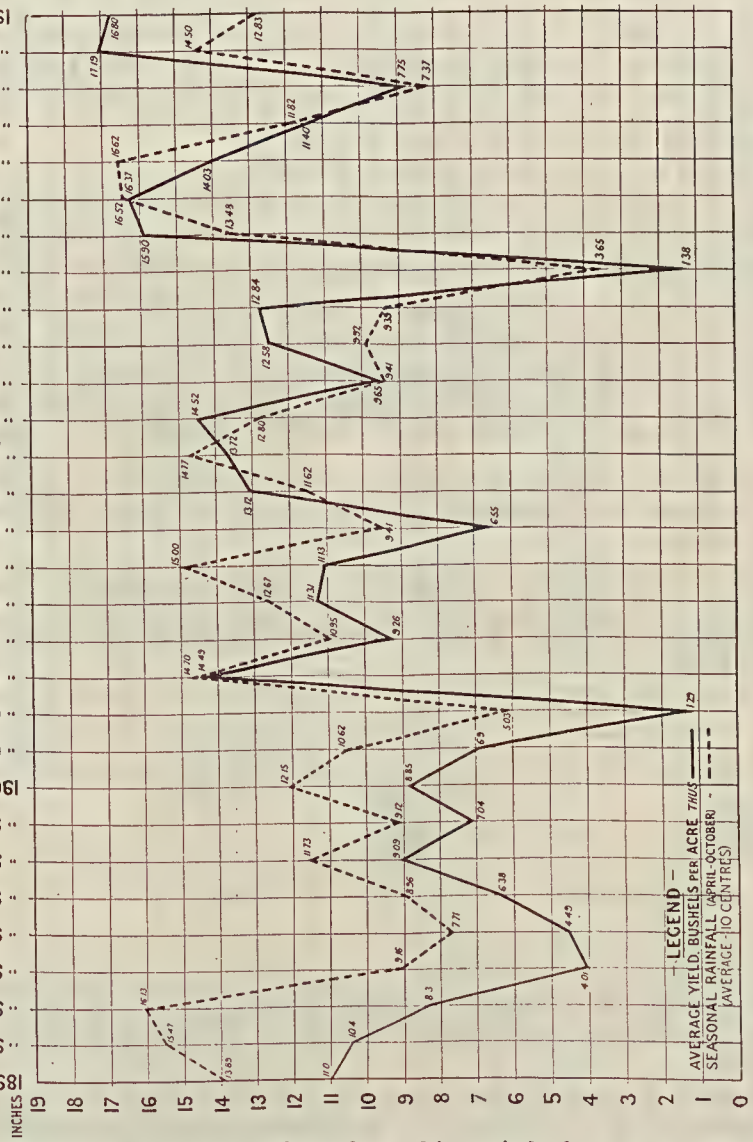


Fig. 58.—Graph showing Relationship between Average Wheat Yield and Seasonal Rainfall in Victoria, 1892–1921.

10.26 bushels per acre. Throughout this period of 30 years the wheat-growers of Victoria secured on an average .89 bushels of wheat for every inch of winter rainfall.

The fluctuation of the average yield with the variation in seasonal rainfall are shown in the accompanying graph.

Reference to the graph will show that the average wheat yield of Victoria has shown a consistent improvement, notwithstanding the fact that, during the past two decades, several million acres of relatively poor land in the dry Mallee areas have been won for settlement.

In these newer Mallee areas, which form a considerable proportion of the wheat belt, wheat-growers have not yet been able to completely abandon pioneering methods which, in the Mallee, always result in low average yields. Advanced methods of wheat farming cannot be applied to these areas until the Mallee roots and shoots are completely eliminated from the soil, a process which takes at least from seven to ten years under the prevailing method of treatment.

It will be noted that from 1892 to 1907 the line representing the composite seasonal rainfall in inches was above the line representing the average wheat yield in bushels per acre, though the two lines, widely separated in the earlier years, show a gradual convergence. From 1908 to 1921 the line representing the wheat yield was above the line representing the seasonal rainfall in nine years out of fourteen. These were the years when Victorian wheat-growers reaped more than a bushel of wheat for each inch of winter rainfall. For the seasons 1922 and 1923 the records were:—1922—seasonal rainfall 10.94 inches, yield 13.5 bushels per acre; 1923—seasonal rainfall 14.60, yield 15.4 bushels per acre.

If we now compare the average seasonal rainfall with the average wheat yields over decennial periods, we arrive at the following position:—

TABLE XXVII., SHOWING FOR DECENNIAL PERIODS THE AVERAGE WHEAT YIELD IN BUSHELS PER ACRE, COMPOSITE SEASONAL RAINFALL IN INCHES, AND RATIO WHEAT YIELD TO RAINFALL FOR VICTORIA, 1892-1921.

Decennial Period.	Average Wheat Yield of State.	Composite Seasonal Rainfall.	Ratio $\frac{\text{Wheat Yield.}}{\text{Rainfall.}}$
	Bushels.	Inches.	
1892–1901	7·65	11·49	·67
1902–1911	10·50	11·63	·90
1912–1921	12·62	11·59	1·90
Average for 30 years ..	10·26	11·59	·89

Thus the ratio of wheat yield to seasonal rainfall shows a steady increase from .67 in the first decade to 1.09 for the last decade, with an average value of .89 bushels per inch of rain for the whole period of 30 years.

Because of the addition of large areas of the drier Mallee country to the wheat belt in recent years, and the pioneer methods still prevailing in the newer Mallee, the wheat yields of the last decade cannot be regarded as the probable normal yields for Victoria. The better idea of the progress of wheat-growing methods may be obtained by studying the relationship of rainfall to wheat yield in an old settled district of moderate rainfall, e.g., the Wimmera.

The accompanying graph shows the relationship between wheat yields and seasonal rainfall for an average cropping area of 600,000 acres of wheat for the Wimmera, comprising the three counties of Lowan, Borung, and Kara Kara.

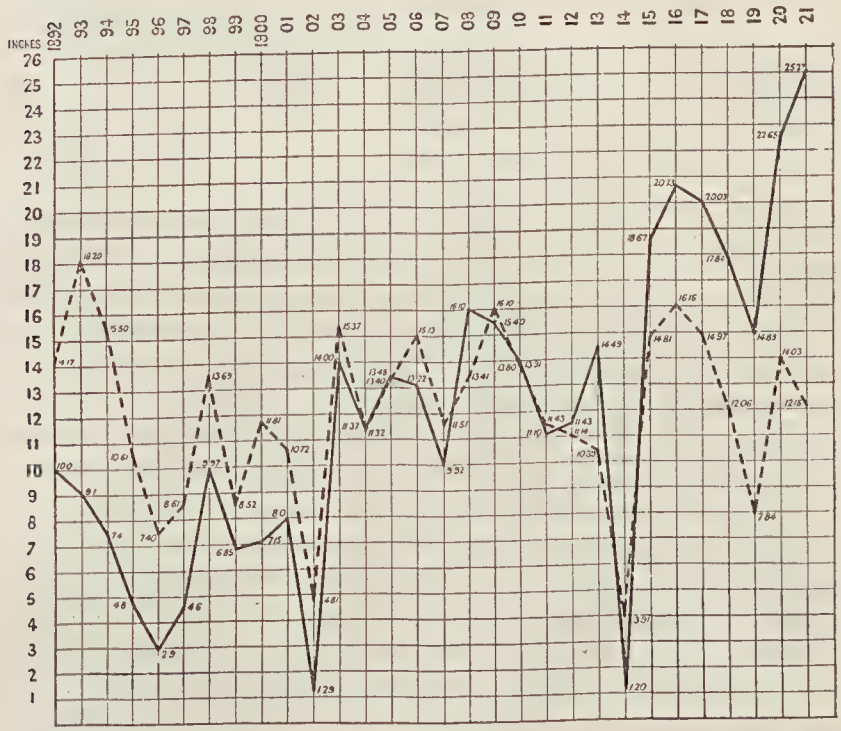


Fig. 59.—Graph showing Relationship between Average Wheat Yield and Seasonal Rainfall in the Wimmera, Victoria, 1892–1921.

Average Yield in bushels per acre thus ——————
Seasonal Rainfall (April-October) thus - - - - - - - - - - - - - - -

The same general relationship holds for the Wimmera as for Victoria.

From 1892 to 1903 the rainfall graph was consistently above the graph representing wheat yield, but the two graphs show a gradual convergence. From 1903 till the drought of 1914 the graphs follow one another very closely. From 1915 to 1921 the graphs show increasing divergence indicating that the ratio wheat yield to rainfall is gradually increasing.

This is shown in Table XXVIII., which summarizes the wheat yield to rainfall ratio for three decades.

Table XXVIII., showing for Decennial Periods the Average Wheat Yield in Bushels per Acre, Composite Seasonal Rainfall in Inches, and Ratio Wheat Yield to Rainfall for Wimmera, 1892-1921.

Decade.	Wheat Yield.	Seasonal Rainfall.	Ratio $\frac{\text{Wheat Yield.}}{\text{Rainfall.}}$
	Bushels.	Inches.	
1892–1901	·08	11·93	·59
1902–1911	11·79	12·41	·59
1912–1921	16·72	11·74	1·43

The ratio wheat yield to rainfall was .59 for the first decade as compared with .67 for the whole State, whilst for the last decade the ratio was 1.43, considerably above the average for the State.

During the first decade the highest ratio for the Wimmera was obtained in 1899, when .8 of a bushel of wheat was reaped per inch of rain. During the second decade 1.2 bushels were reaped in 1908 and 1911 for an inch of rain. During the last decade a yield of 2.07 bushels per inch of rain was obtained during 1921.

Omitting the drought year, 1914, during which only 3.9 inches of rain fell in seven months, the average ratio for the nine remaining years of the past decade was 1.66 bushels per inch of rain.

Marked developments in wheat-growing methods in the Wimmera have taken place during the past two decades. The first advance was brought about by the introduction and general use of superphosphate. Comparatively few wheat-growers used superphosphate with their crop in 1900. By 1910 the use of superphosphate became general in the Wimmera. The next improvement was the introduction of Federation wheat—a creation of Farrer's—a short-strawed, spare-stooling wheat, with marked drought-resisting powers, and possessing a high migration ratio, i.e., a high proportion of grain to straw. This variety proved of exceptional value for Wimmera conditions, and now it is grown on nearly every Wimmera farm.

The discovery of the value of summer fallowing, and the thorough working of the fallows, resulted in a considerable increase in crop yield. To-day practically 100 per cent. of the Wimmera wheat crop is sown on fallow land.

Two further developments occurred during the past decade, which promise to augment the wheat yields still further—heavy manuring and late seeding. The value of liberal manuring was brought out by the establishment by the Department of Agriculture of permanent manurial tests in 1911 at the Longerenong Agricultural College, situated in the heart of the Wimmera. On these plots it was shown that dressings of superphosphate up to 2 cwt. per acre were much more profitable than the dressings then in vogue in the district, viz., from 56 lb. to 60 lb. per acre.

It was proved by monthly analyses of the soil through a series of years that careful fallowing of the black clay loams of the Wimmera enabled 91.9 lb. of nitrate nitrogen, equivalent to 5 cwt. of nitrate of

soda, to be made available at seed time as a result of the action of the nitrifying bacteria during the summer months. Under these circumstances, heavy dressings of phosphate in the presence of an abundance of nitrate nitrogen and free carbonate of lime, supplemented by much conserved soil moisture, have enabled big wheat crops to be obtained on a moderate seasonal rainfall.

Finally, the adoption of late seeding has led to increased yields in the Wimmera. This practice not only permits the more complete extermination of weeds—competitors for the limited soil moisture—but also increases the proportion of grain to total dry matter produced.

The value of late sowing, as compared with early sowing on the black clay loams of the Wimmera, was strikingly illustrated by the experiments conducted by the Department of Agriculture at the Longernong Agricultural College. Six varieties of wheat, two early maturing, two mid-season, and two late maturing types, were sown during the normal seeding period for Victoria (May), and the same six varieties were sown at a time that would be regarded as very late, i.e., July.

The average yield of the late-sown plots for a seven-year period was 36.3 bushels per acre as compared with 31.5 bushels for the same varieties sown early, i.e., an increase of 15.2 per cent. in favour of late sowing. The varieties differ considerably in the relative order of yield from year to year, but, on the whole, Federation, both for early and late sowing, has given uniformly higher yields than any of the varieties tested.

On the whole, late sowing has been found advantageous in normal and wet years, whilst in dry seasons the advantages from late sowing are not noticeable.

The effect of early and late sowing is very pronounced on the general development of the plant, and in particular on the relative proportion of grain to total dry matter. Early sowing on the Wimmera soils produces a tall, leafy crop, with a relatively low percentage of grain to total dry matter.

Late sowing, on the other hand, produces shorter crops, with a higher percentage of grain to total dry matter.

It would appear that in the majority of seasons the wheat crop removes from the soil practically the whole of the available moisture supply.

Both with early sowing and late sowing the amount of *total* crop produced was much the same, the tendency being towards the production of larger total crops from the early sowings.

As, however, the proportion of grain in the late-sown crop is much higher than with the same variety sown early, the yield of grain per acre is greater for the late sowing than for the early sowing.

Under the conditions obtaining in the Wimmera in normal seasons we may safely assume that a well-developed wheat crop will practically exhaust the soil of its available moisture supplies. In doing so, a given amount of dry matter is produced per acre, an amount determined by the Transpiration Ratio for that particular season. We have already seen that in any given season different varieties of wheat do not vary materially as regards their Transpiration Ratio for dry matter, though there is considerable variation in the Transpiration Ration for grain.

In any given season the available moisture supply of the soil is capable of producing a given definite amount of dry matter, but as the late-sown crops produce a higher proportion of grain and a correspondingly lower proportin of flag and straw, the late-sown crops will produce a greater quantity of grain at lower water cost than the early-sown crops.

Summing up, we may say that the main developments which have brought about an increase in the average yields of wheat in the Wimmera are the following:—

1. The adoption of late seeding, which invariably results in an increase in the grain yield, a marked increase in the proportion of grain

Fig. 60.—Map of Australia showing Average Annual Temperature.
The dotted line in Western Australia includes the area with no stations. (After H. A. Hunt.)

to total dry matter, and a reduction in the water cost of grain produced compared with early sowing.

2. The recognition of the value of fallowing, and of the thorough working of the fallows to retain soil moisture and promote nitrification. Summer-fallowing, or the adoption of a fifteen-months' fallow, is becoming general in the Wimmera.

3. The use of heavy dressings of water soluble phosphate, especially where cultural methods are through. Heavy dressings of superphosphate, when supplemented by conserved soil moisture and abundance of nitrates, lead to increased wheat yields at a lowered water cost.

4. The general use of a variety of wheat—Federation—which, under actual field tests, has proved to be better suited to Wimmera conditions than any other variety.

Many of the best farmers in the Wimmera are reaping bags per acre where they reaped bushels per acre twenty years ago.

We may now consider what yields may ultimately be expected on a rainfall similar to that of the Victorian wheat belt, and in the Wimmera area. It has been shown that the wheat yields, expressed in terms of seasonal rainfall, have been steadily increasing for the past three decades. Is there a limit to the possible increase, and, if so, what are the probable ultimate yields expressed in terms of seasonal rainfall? To obtain data on this problem the writer conducted some exhaustive

Fig. 61.—Map of Australia showing Relative Humidity for the month of October. (After H. A. Hunt.)

experiments on the water requirements of wheat and the factors affecting the water requirements. The results of this inquiry were summarized in the Bulletin, *Water Requirements of Farm Crops.** From this study the following conclusions were arrived at. The water requirement, expressed as a Transpiration Ratio, was not a constant and definite quantity for any given crop, but varied from season to season, and in different localities, due to natural climatic differences. A consistent relationship was established between the water requirement and the rate of evaporation from a free water surface during the period of maximum transpiration. High water requirements were found to be associated with intense evaporation during the period of maximum transpiration.

* *The Water Requirements of Farm Crops* (1923)—A. E. V. Richardson, Department of Agriculture.

This intense evaporation represents the summation of the effects of high-air temperature, low atmospheric humidity, and wind velocity. Conversely low water requirements are associated with cool, humid, wind-still conditions during the period of maximum transpiration. As localities and seasons vary considerably with respect to the intensity of the physical environmental conditions during this period of heavy transpiration, the Transpiration Ratios must necessarily vary.

The Transpiration Ratio of farm crops is profoundly influenced by the season. In a season of low annual rainfall, with hot, dry, windy weather at the critical period of maximum transpiration, a given crop will show a higher water requirement than in a season with cool, humid weather during the same period. The rate of evaporation from a free water surface during the period of maximum transpiration is an index of the water requirement of the crop. A knowledge of the rate of evaporation from a free water surface is thus as important as a knowledge of the rainfall and its incidence in determining the suitability of arid lands for settlement. The evaporation from a free water surface is affected by atmospheric conditions in much the same way as the transpiration from the plant. Regions of low annual rainfall are usually regions of high evaporation. In such localities the Transpiration Ratios must necessarily be high so that crops are likely to suffer the double disadvantage of shortage of rainfall and high transpiration rate. Evaporation from a free water surface is dependent on air temperature, dryness of the atmosphere, and wind velocity.

The evaporation steadily increases as we pass from the southern coast to the arid interior. The following table summarizes the evaporation from a free water surface at selected centres, the annual rainfall, and the evaporation rate during the critical month of October:—

Table XXIX., showing Mean Annual Rainfall, Mean Annual Evaporation, and Evaporation for October in Inches at Selected Centres.

	Annual Rainfall.	Evaporation, October.	Annual Evaporation.
Hobart (Tasmania)	23·66	2·90	32·41
Sydney (New South Wales) ..	48·12	3·71	38·00
Melbourne (Victoria)	25·60	3·34	38·81
Werribee (Victoria)	20·50	4·06	46·19
Rutherglen (Victoria)	21·50	3·71	52·80
Adelaide (South Australia) ..	21·03	4·73	54·49
Perth (Western Australia) ..	33·10	5·27	66·13
Dubbo (New South Wales) ..	22·04	7·29	66·37
Broken Hill (New South Wales) ..	9·65	7·78	85·64
Coolgardie (Western Australia) ..	9·27	7·49	87·74
Alice Springs (Northern Territory) ..	10·99	9·55	94·84
Marble Bar (Western Australia) ..	14·24	11·30	115·34

The average transpiration rate for wheat over a period of five years was shown to be 395 for Victoria.

A Transpiration Ratio of 395 means that 395 tons of water must pass through the crop to produce 1 ton of dry matter. A crop of wheat weighing 1 ton (grain and straw) will usually produce about 13 bushels of grain. In these tests the production of 1 ton of grain requires the passage of 1,067 tons of water through the crop.

This quantity of water is equivalent in weight to 10.53 inches of rain over 1 acre. Hence if 10.53 inches of rain must be transpired by a

wheat crop to produce 1 ton of grain, each inch of rain passing through the crop should produce, on an average, 3.54 bushels of wheat. In other words, in an average season, for moderate rainfalls, each inch of rain transpired by the crop is capable of producing a yield of 3.54 bushels per acre.

It was shown that, in the Wimmera District, where cultural methods have greatly improved during recent years, the average yield for the past decade, expressed in terms of rainfall, was 1.43 bushels of wheat per acre for each inch of seasonal rain.

For the last five years of the period 1.68 bushels of wheat have been obtained for each inch of rain. At the Longerenong Agricultural College, situated in the centre of the Wimmera, the average of 3.5 bushels of wheat per inch of seasonal rain was obtained for a period of five years, and on two private farms in the Wimmera yields of 3.48 and 3.6 bushels per acre have been obtained during the same period.*

The following table summarizes the rainfall records and crop yields for Longerenong Agricultural College for the period 1913-1921:—

Table XXX., showing Total Rainfall, Seasonal Rainfall (April to October), Crop Yields, and Ratio, Wheat Yield to Rainfall, at Longerenong Agricultural College, 1913-1921.

Month.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.
January	·60	·42	·55	·87	·61	·72	·06	·30	1·94
February	3·10	·90	·07	·09	1·66	·69	2·34	·02	1·61
March	2·20	·65	·12	·03	·74	·84	·97	·76	1·03
Seasonal Rainfall: April	·60	2·10	1·00	·60	·44	2·10	·13	·08	·29
Seasonal Rainfall: May	1·20	1·00	1·09	·41	2·36	1·99	2·22	1·26	2·18
Seasonal Rainfall: June	·37	·80	3·98	3·40	·77	2·05	·71	1·97	1·30
Seasonal Rainfall: July	1·05	·96	1·40	2·25	2·03	1·44	1·25	1·60	1·85
Seasonal Rainfall: August	2·05	·20	2·54	3·47	1·91	2·21	·91	3·18	1·83
Seasonal Rainfall: September	3·75	·15	4·04	4·03	2·27	·45	1·15	1·98	1·97
Seasonal Rainfall: October	2·22	·09	1·03	1·95	3·01	1·68	·56	1·26	1·28
November	1·03	2·23	·20	2·65	·51	·21	·14	1·88	1·52
December	·83	2·70	·58	1·80	·48	·37	1·04	·82	·86
Total inches	19·00	12·20	16·60	21·55	16·79	14·75	11·48	15·11	17·66
Rainfall, April–October	11·24	5·30	15·08	16·11	12·79	11·92	6·93	11·33	10·70
Yield per acre for whole farm (bushels)	26·0	6·0	28·0	34·1	30·5	36·2	27·1	38·0	42·0
Ratio, Wheat Yield to Rainfall	2·3	1·1	1·8	2·1	2·3	3·0	3·9	3·4	3·9

These records of crop yields are highly significant. They are the more valuable because they represent the average yield from a considerable area of crop, and include the whole area sown for grain each

* Vide *Water Requirements of Farm Crops* (1923)—A. E. V. Richardson, Department of Agriculture Bulletin.

year. It will be noted that the combined effect of the liberal dressings of fertilizers, late seeding, and increasing the quantities of seed as the seeding season advances, have resulted in remarkably heavy crops during the past four years. Notwithstanding the fact that the last four seasons were drier on the whole than any four consecutive seasons hithero experienced, the average yields were much higher.

Thus the average rainfall for the last four years was 14.75, of which an average of 10.22 fell from April to October. The seasonal rainfall for these years is *below* the average of the State and *below* the average of the Wimmera district for 30 years. Notwithstanding these facts, the average wheat yield for the four years was 35.8 bushels, or 3.50 bushels of wheat for every inch of seasonal rain. That is to say, the

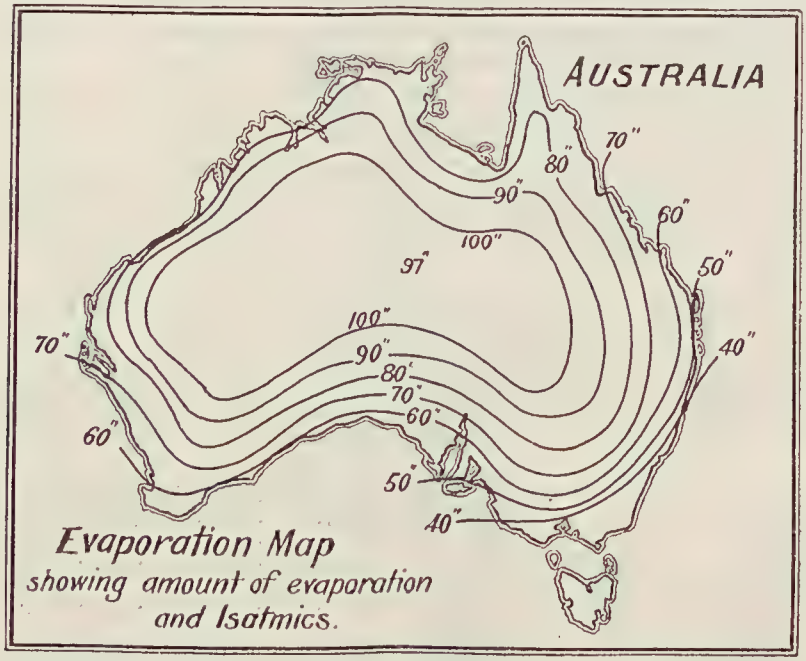


Fig. 62.—Map of Australia showing Lines of Equal Evaporation. (After H. A. Hunt.)

wheat yields obtained at Longerenong for the last four years are practically the maximum yields that might be expected if the whole of the rainfall received between April and October were transpired by the crop and no losses were experienced by evaporation.

Evaporation losses from the soil during the growing period of the crop are, of course, inevitable. These losses can be ascertained with certainty only by growing the crops under field conditions in specially constructed drain gauges. Large as the losses by evaporation may be, it is probable that they are at least counterbalanced by the moisture conserved from the previous year by bare fallowing. In fact, in a typical year at Longerenong, the writer showed that a well-worked fallow conserved by the 1st of April, in the first 4 feet of soil, an extra

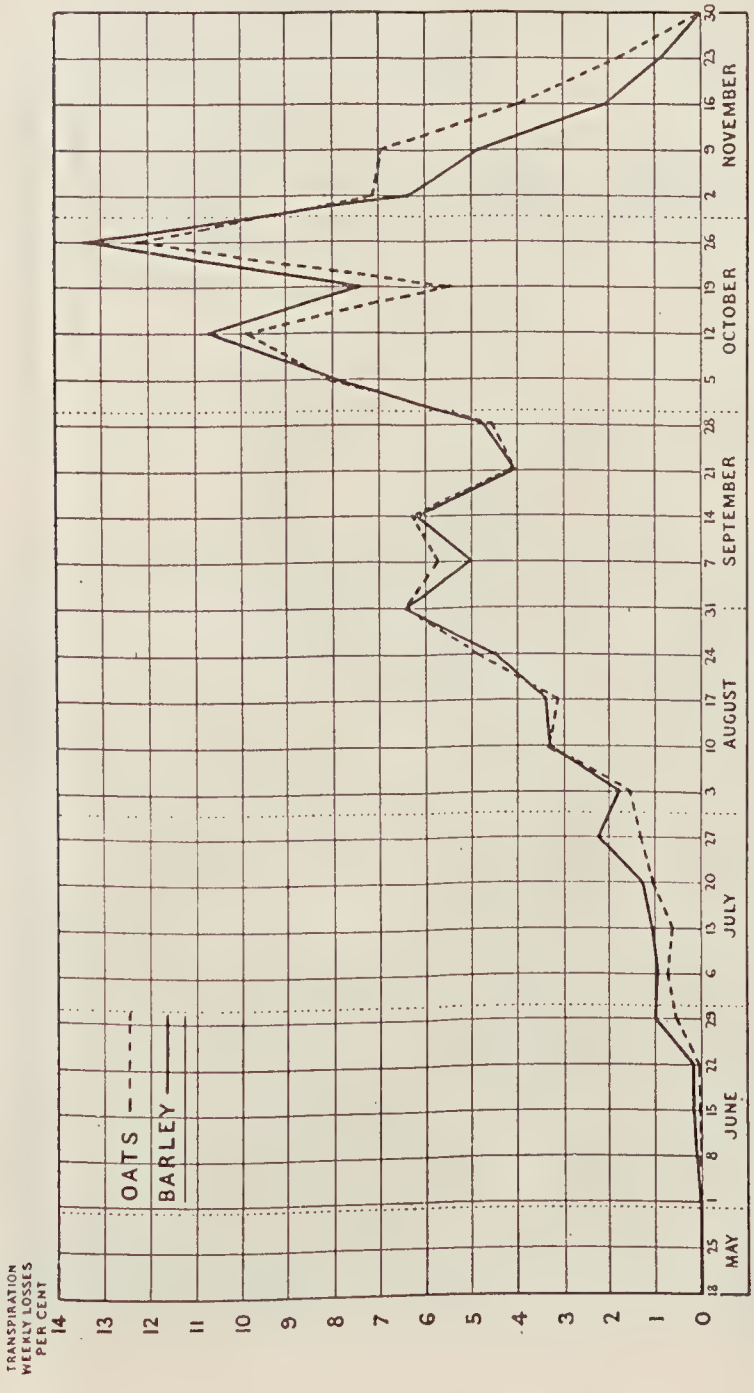


Fig. 63.—Weekly Losses by Transpiration for Oats and Barley Expressed as Percentages of Total Transpiration.

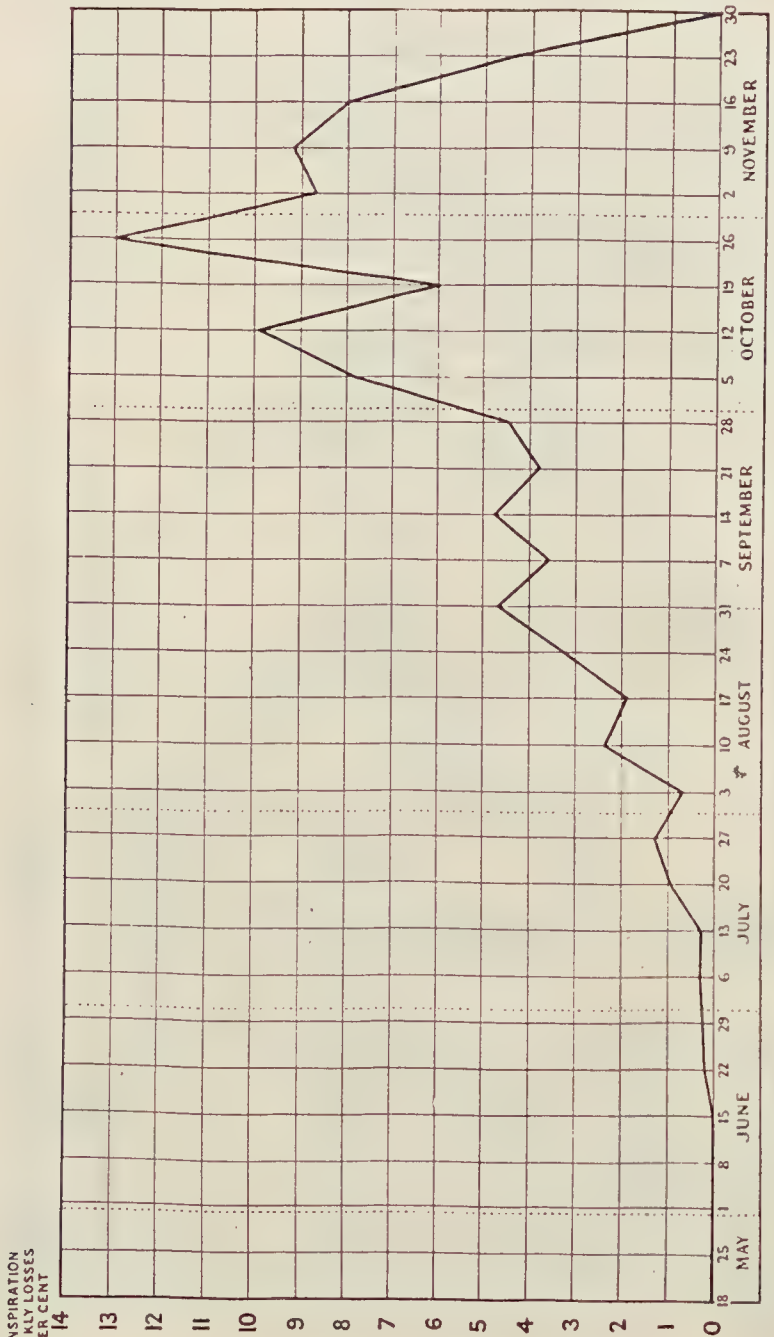


Fig. 64.—Amount of Water Required Weekly by a Wheat Crop throughout its Period of Growth Expressed as Percentages of the Total Water Used.

4.14 inches of rain compared with pasture land, and extra water equivalent to 3.43 inches of rain compared with a neglected fallow. Hence, assuming the water lost by evaporation from the soil is approximately equal to the amount conserved by fallowing, the seasonal rainfall during the past four years gave a wheat-yield which was approximately equivalent to the theoretical maximum.

As the average seasonal rainfall for Victoria is 11½ inches, it would appear that the maximum possible yield, based on the rainfall, would be 40 bushels per acre. At the present time the average yield is only one-third of this amount. It is possible, therefore, to greatly increase the average wheat yield of the State before the limits imposed by the rainfall are approached.

(*To be continued.*)

THE WOOLLY APHIS PARASITE (*Aphelinus Mali.*)

By G. T. Levick, B. Agr. Sc., Science Field Officer.

Although the use of parasites is a comparatively recent development in combating the insect enemies of the orchardist in this country, it is many years since the Ladybird (*Novis cardinalis*) was taken from Australia to California and South Africa, to save the citrus groves from utter destruction from the ravages of the Cottony Cushion Scale (*Icerya Purchasi*). This scale, which was threatening the industry, had been accidentally introduced from Australia, and lacking the natural enemies which in its native habitat tended to keep the pest under control.

Since then many attempts have been made, with a greater or lesser degree of success, to acclimatize parasites for introduced pests in Australia, of which one or two instances may be cited. About fourteen years ago, a Ladybird was introduced into Victoria from Western Australia by Mr. C. French, jun., the Government Entomologist. This insect was allotted the task of combating the Woolly Aphis and the Red Scale (*Chrysomphalis aurantii*), and would doubtless have been very successful had our insectivorous birds not found the introduced insects an easy prey, exterminating them before they had become established in their new home. A similar fate, unfortunately, is apt to be the end of many of those introduced beneficial insects which survive the rigours of transportation and introduction to a new climate.

A more successful introduction was made by Mr. French from Western Australia some years later, when a hymenopterous parasite was imported to combat the Vine Scale (*Lecanium berberides*), and liberated at Yering and Whittlesea. Mr. de Castella, the Viticulturist, reports that the results from this parasite have been most satisfactory. A recent inspection by Mr. French and the writer of Mr. Dawson's vineyard at Whittlesea, where the Vine Scale had resisted all efforts at control by spraying methods, revealed the fact that not a single live scale could be discovered by the most diligent search.

Most of the noxious orchard insects have been found to be parasitized, but unless we can in some way upset the "Balance of Nature" they can do little to modify the depredations of the pest, being themselves held in check by their natural enemies. The chalcid wasps, parasitic on the green Peach Aphis, on the Cabbage Aphis, on the Bag Moths; the Syrphid Flies on aphids of all kinds, and the well known Ladybirds are but a few examples of these parasites.

A wasp predaceous on the Apple Root Borer (*Leptops hopei*) was discovered by Mr. Davey, infesting a large percentage of the Borers in the Geelong and Kyabram districts. Little work, however, has been done on this up to the present, but it is hoped that the exploitation of this parasite may lead to very useful results.

The latest development in this line, however, and one that appears to be of very great economic value, is the rearing and distribution of *Aphelinus mali*, the little wasp that has proved so deadly to the Woolly Aphis. This aphis has been one of the worst pests with which the Victorian apple-grower has had to contend, various orchardists estimating the value of sprays applied to combat it at from £2 10s. to £5 per acre

G. Levick, del.

Woolly Aphis Parasite (*Aphelinus mali*).
(Very much magnified.)

per annum, not to mention the damage done to the trees, with the consequent loss of fruit.

Aphelinus mali is a small black chalcid wasp, with a yellowish band on the base of its abdomen. The females are about one-sixteenth of an inch in length, and the males slightly smaller. Both sexes are extremely active, and besides flying, can jump considerable distances. The period taken to complete their life history is rather variable, a great deal depending on the climatic conditions. Dr. Tillyard, of New Zealand, who first procured the parasite from America, mentions five to six weeks as the time occupied by their life-cycle, but in Victoria we have found it to be as short as three weeks, which augurs well for the rapid multiplication of the insect.

The female wasp pierces the skin of an aphid with her ovipositor, at the same time depositing a single egg in the substance of the unwilling host. From 50 to 100 aphides are thus parasitized by a single female, which, her purpose in life being effected, soon dies. In a short time the egg hatches and the tiny maggot ravenously devours the interior of the aphid within the hardened skin of which it eventually pupates.

The wasp remains as a pupa for an indefinite period, varying from a few days in the hot weather to some months during the winter period. When ready to emerge, the young wasp pushes its way through the end of the pupa case (the dried skin of its one-time host), and steps forth a perfect insect. Pairing takes place immediately, and the females proceed very actively to find the Woolly Aphis to nourish a new generation. The females may survive approximately a week after emerging, but the males are comparatively short lived.

Owing to the fact that the wasp is most active during the summer time and remains dormant for a considerable period during the winter months, while the Woolly Aphis continues its work of destruction, overtaking the parasite in the early spring, some time must elapse before the Aphelinus can completely wipe out the "Blight." This must be borne in mind by the growers who have received supplies of the parasite this summer, and they must not think that in the Aphelinus they have an instant panacea for all their aphid troubles, as some of the more optimistic seem to think.

(To be continued.)

ORCHARD NOTES FOR APRIL.

Green Manures.

If a cover crop of leguminous plants is required for green manuring a start at planting may now be made. This can be done only when all the fruit has been gathered from the trees. An early crop is a distinct advantage. The cover crop should make a good growth before the winter sets in, as the plants make very little headway in the cold weather, and they require to be ploughed in as soon as the ground is dry enough in early spring. It will thus be seen that it is necessary to get a good autumn growth, as dense as possible, and one which will adequately cover the surface before winter.

Cultivation.

Should the weather remain hot and dry it will be very necessary to give the land surface a good stirring, so as to conserve water supplies. Where fruit crops have been gathered a start may be made late in the month with the autumn ploughing; whatever ploughing is done should be left as rough as possible.

Pests.

No codlin moth-affected or diseased fruit of any kind should be left on the ground after the crop has been gathered. These should all be destroyed by boiling.

All rust-affected foliage and fruit of plum and peach trees, as well as all other stone fruits that have been attacked by this and other fungus diseases, such as shot-hole, &c., should be burned if possible. This will minimize the possibility of future attacks.

STANDARD HERD TEST.

Report for Quarter ended 31st December, 1924.

During the quarter, cows to the number of 182 completed the test. Of these, 114 qualified for the certificate. The amount of butter fat required for qualification varies according to the age of the animal (up to five years) at time of calving. The standards are as follow :—Junior 2-year-old (under 2½ years at time of calving), 200 lb. butter fat; senior 2-year-old (between 2½ and 3 years), 225 lb.; junior 3-year-old (between 3 and 3½ years), 250 lb.; senior 3-year-old (between 3½ and 4 years), 275 lb.; junior 4-year-old (between 4 and 4½ years), 300 lb.; senior 4-year-old (between 4½ and 5 years), 325 lb.; mature cow (5 years and over), 350 lb.

The quarter is marked by the highest butter fat yield yet recorded in the Standard Test, the production of "Babs of Somerville" being 843 lb. of butter fat as against the 720 lb. of "Dominion Queen Mercedes"—the previous best.

The record of each individual cow which finished during the quarter is shown in the following, the *italics* indicating those animals which failed to yield the requisite amount of butter fat for a certificate :—

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs	lbs.	
Mrs. F. M. Akehurst, Tunstall	2	Nil	Jersey ..	*Canary 11th of King's Vale* ..	7181	7.3.24	273	15½	6,102	5·19	*316·95*	350	255, 188, 186
				Violet of Rock Lee	11214	15.3.24	273	14½	5,081	5·11	*259·86*	350	177, 179, 171
Alston Estate, Cobram	3	3	Jersey ..	Annie G. of Tarnpirr ..	6022	27.2.24	273	16	6,426	5·96	383·07	350	284, 339, 366
				Regina of Tarnpirr ..	10128	3.3.24	273	19	6,933	6·55	454.31	350	253, 336, 421
				Bonnie Annie of Aberdour ..	12849	15.3.24	273	15	5,691	5·29	301·00	275	227, 323
J. Anderson, junr., Lyndhurst	2	1	Jersey ..	*Lucy of King's Vale* ..	3809	25.1.24	273	16	5,966	5·85	*348·86*	350	377, 375
				Canary 12th of King's Vale ..	10130	12.2.24	273	36½	10,078	5·23	527·19	300	404, 469
W. H. Atherton, Murraydale	1	1	Jersey ..	Rarity of Meadowvale ..	10134	11.3.24	273	12½	6,050	6·57	397·28	300	331
W. K. Atkinson, Swan Hill	3	1	Shorthorn	*Queenie 4th of Willow Park* ..	12557	2.2.24	273	12½	4,868	4·40	*214·05*	250	203
				Jessie of Willow Park ..	Not yet allotted	7.3.24	273	25	7,454	4·09	305·23	225	
				Ruby of Willow Park ..	„	14.3.24	273	17	4,901	4·33	*211·99*	225	

Standard Herd Test—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs.	
F. Austin, Lara ..	3	3	Jersey ..	Graceful Countess 2nd of Lesterfield	10268	4.1.24	273	23	7,671	6·33	485·14	350	210, 369, 408
				Mercedes Buttercup 2nd of Avalon	12865	7.3.24	273	14	4,441	5·67	251·70	200	
				Belle of Colac	4024	24.3.24	273	29	11,871	4·17	494·87	350	346, 349
Ballieu Bros., Torumbarry, near Echuca	2	1	Jersey ..	Attraction of Peerallilea ..	14951	31.1.24	273	13	4,186	5·45	228·01	200	
				Annette 6th of King's Vale ..	6335	6.2.24	273	16	5,587	5·00	*279·09*	350	277, 282
C. Bamford, Benalla	1	1	Ayrshire	Moonlight of Medburn Grove	10750	20.3.24	273	25	9,276	3·74	346·80	325	203
A. E. Batson, Buckley	2	Nil	Jersey ..	*Lady Marge 3rd of Somerset* ..	13693	1.1.24	273	10	2,782	5·15	*143·38*	200	
				Daphne of Somerset ..	9192	5.1.24	273	10	4,015	5.52	*221·60*	300	158, 260
Mrs. I. Beard, Outtrim	2	2	Jersey ..	Daisy of Linga Longa ..	12868	25.1.24	273	17	4,019	6·41	257·60	225	232
				Bolinda of Linga Longa ..	14125	5.2.24	273	15½	4,211	6·95	292·78	200	
F. W. Beischer, Bendigo	1	Nil	Jersey ..	*Trixie 3rd of Linden* ..	15342	22.3.24	223*	11½	3,144	5·77	*181·54*	225	
F. Bidgood, Staghorn Flat	1	Nil	Jersey ..	*Lucy of Staghorn*	9211	24.3.24	273	23	6,188	5·21	*322·27*	350	286, 356, 281
Callery Brothers, Bannockburn	1	1	Ayrshire	Belle of Langley Park ..	11823	10.1.24	190*	19½	4,888	4·68	228·84	200	
S. S. Cameron, Hawthorn	1	Nil	Jersey ..	*Duke's Spark of Glen Iris* ..	12881	12.2.24	217	4	2,967	5·98	*177·62*	300	199, 244

* Withdrawn before completion of term.

Standard Herd Test—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs	
P. Chirnside, Oakleigh	1	1	Jersey ..	Werribee Northwood Madeira 6th	6540	21.1.24	273	20	7,361	5·66	416·60	350	426, 412, 393, 368
H. Cowling, Mornington	1	1	Jersey ..	Chevy 13th of Melrose ..	11775	26.3.24	273	22	6,681	5·93	396·38	250	285
O. Cutler, Murraydale	1	1	Jersey ..	Bright Stockings of Warenda	7189	24.1.24	273	19	8,222	5·46	449·15	350	238, 296, 306
E. A. Dennis, Swanpool	2	1	Jersey ..	My Hope 2nd of Lynuilg ..	14968	4.2.24	272	12½	3,980	6·58	261·72	200	
				Royal Sun Ray	9710	14.3.24	273	26	6,938	4·78	*331·34*	350	339, 287, 360
Department of Agriculture, Werribee	1	1	Friesian	Dominion Coringa	380	26.3.24	273	44½	13,554	3·24	438·72	350	481, 460, 499, 484, 432
	4	3	Red Poll	Victoria Elite	715A	26.2.24	273	20½	6,332	4·21	266·71	200	
				Laodicea	306B	2.3.24	273	19½	7,316	3·94	*288·52*	350	212, 245, 323
				Victoria Bellata	786B	3.3.24	273	21½	6,412	4·41	282·60	200	
				Queen Elizabeth	400C	6.3.24	273	32	11,196	4·17	466·50	350	300, 428, 427
C. Deverell, Wangaratta	4	4	Jersey ..	Minuet of Banyule	6075	28.2.24	273	15	6,450	5·82	375·68	350	476
				Gold Mine of Methven ..	Not yet allotted	6.3.24	273	18	5,527	5·64	311·98	200	
				Una of Wooringa	12175	6.3.24	273	11½	5,089	6·91	351·17	225	363
				Lantana's Superior of Methven	Not yet allotted	25.3.24	273	12½	4,121	6·91	284·67	200	
Dickinson Bros., Sebastopol	1	1	Friesian	Countess 4th of Ashby ..	1004	11.1.24	218*	32½	8,674	3·64	315·38	250	256

* Re-calved prematurely.

Standard Herd Test—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs.	
P. J. Ducat, Shepparton	4	2	Jersey ..	*Rosebud of Jersey Vale* ..	14976	9.3.24	273	12½	3,522	5·38	*189·36*	200	174
				Myrtle 2nd of Jersey Vale ..	7222	11.3.24	273	15½	6,083	5·03	*305·83*	350	190, 203, 275
				Ruby of Jersey Vale ..	10359	19.3.24	273	14	6,444	4·97	320·39	275	166, 248
				Buttercup of Airlie ..	10203	21.3.24	273	18	5,776	6·41	370·43	250	286
S. H. Ebery, Newstead	1	1	Shorthorn	Daisy 8th	Not yet allotted	20.2.24	273	23	7,898	4·26	336·56	300	255
G. Esler, Tongala ..	1	1	Jersey ..	Jubilee Lily	10454	26.3.24	273	14	5,957	5·57	331·86	300	
R. Faragher, Koroit	3	2	Jersey ..	Clover of Saranac	9313	9.1.24	273	16	5,993	6·15	368·30	325	327, 364
				Clover of Mona Bank ..	11400	15.3.24	273	10	4,750	5·79	274·80	225	235
				Clover 2nd of Mona Bank ..	Not yet allotted	15.3.24	252*	5½	2,653	5·78	*153·24*	200	
T. R. Findlay, Leitchville	1	1	Jersey ..	Sylvan Grey of Leven Brae ..	14150	20.2.24	273	14½	4,181	4·88	204·19	200	
Finn Bros., Bundoora	3	2	Jersey ..	*Curiosity of Holmwood* ..	6483	25.1.24	273	16½	6,123	5·66	*346·78*	350	298
				Valda of Comelybanks ..	13723	5.2.24	273	15½	4,850	5·86	284·38	200	
				Jubilee Cherry's Fawn ..	7339	26.2.24	273	19	7,203	6·29	453·07	350	350, 306, 159, 212
A. Fixter, junr., Boisdale	1	1	Jersey ..	Beauty's Daffodil of Lesterfield	10265	15.3.24	273	26½	9,954	5·30	527·56	350	304, 208, 364, 422
W. Fixter and Son, Boisdale	1	1	Jersey ..	Queenie of Riversdale ..	12922	15.2.24	273	13	5,547	5·87	325·44	250	246

* Withdrawn before completion of term.

STANDARD HERD TEST—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs.	
Flack and Sewell, Berwick	14	14	Friesian	Rosevale Cordele Posch ..	1378	13.1.24	273	29	14,060	3·16	444·35	250	371
				Burnbank Inka Segis Bercham	Vol. 5	19.1.24	235*	7½	6,151	4·19	257·64	200	
				Domino Fobes of Yarra Brae	266	20.1.24	273	36	12,446	3·59	446·89	350	281, 312, 349
				Rosevale Jessie Posch ..	1096	23.1.24	273	54½	17,259	3·20	552·16	300	354, 379
				Burnbank Inka Segis Coringa	Not yet allotted	31.1.24	240*	22½	7,362	3·02	222·53	200	
				Burnbank Inka Segis Violet ..	"	14.2.24	273	24	11,385	3·83	436·46	200	
				Rosey 32nd	425	21.2.24	273	14	11,228	3·62	405·91	350	
				Burnbank Dutch Princess ..	Vol. 5	29.2.24	240*	20	5,206	4·65	242·61	200	
				Burnbank Mercedes Maggie ..	1081	7.3.24	273	33	13,160	3·46	455·74	325	307, 514
				Holland Lass 2nd of Berry ..	244	18.3.24	273	35	17,901	3·35	599·85	350	204, 419, 404, 566
				Dominion Homestead Maggie	259	21.3.24	273	40½	17,102	3·32	568·59	350	330, 373, 316, 541
				Springfield Lady 2nd ..	1109	22.3.24	273	31	10,608	3·66	388·66	250	297
				Monavale Catriona Paxton ..	551	24.3.24	273	5	11,997	3·62	434·00	350	356, 412, 426
				Burnbank Mercedes Violet ..	1093	25.3.24	273	41½	18,667	3·21	599·56	300	288, 330
Mrs. M. and W. A. Francis, Kilcunda	1	Nil	Ayrshire	*Duchess of Hillcrest* ..	5139	18.2.24	273	14½	4,934	3·98	*196·16*	350	230, 216, 240
N. Gange, Mininera	1	Nil	Ayrshire	*Petal of Roseleigh*	7303	27.2.24	273	15	9,310	3·69	*343·22*	350	238, 261
Geelong Harbour Trust, Marshalltown	2	2	Ayrshire	Poppy of Sparrovale ..	9106	8.1.24	273	30	8,868	4·15	368·34	250	255
				Janice of Sparrovale ..	7312	22.2.24	269	14½	7,708	4·36	336·26	300	274
Gibson Bros., Trafalgar	1	1	Jersey ..	Peerless of Leathorne ..	11429	3.2.24	273	15	3,980	6·54	256·75	200	
O. G. Handbury, Toora	1	1	Jersey ..	Lassie of Strathbow ..	12205	26.3.24	273	20½	7,482	5·45	407·74	225	237
T. Harvey, Boisdale	4	4	Jersey ..	Lady Marge 2nd of Jerseyholm	9395	28.12.23	273	21½	7,599	5·57	423·01	275	405
				Daisy 6th of Jerseyholm ..	5917	14.1.24	273	23½	7,941	5·28	419·13	350	332, 415, 373, 392
				Bluebell 3rd of Jerseyholm ..	9391	2.2.24	273	19	6,605	5·97	394·51	325	373
				Empress 2nd of Jerseyholm ..	10254	19.3.24	273	12	5,611	6·32	354·63	225	

* Sold before completion of term.

STANDARD HERD TEST—*continued*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs.	
W. Henderson, Grasmere	6	Nil	Ayrshire	*Betsy of Warrook*	2902	4.1.24	273	11½	4,266	4·65	*198·49*	350	249, 137, 180, 95
				Berry of Warrook	2901	5.1.24	273	11½	5,037	5·04	*253·96*	350	393, 252, 296
				Dahlia 3rd of Carracoorte ..	9343	9.1.24	273	10½	5,038	4·70	*236·71*	250	73
				Betsy 8th of Carracoorte ..	9318	14.1.24	273	8½	3,978	4·72	*187·96*	300	162, 118
				Rosebloom 5th of Carracoorte ..	9436	30.1.24	273	6	5,044	4·10	*206·69*	250	137
				Anaca 4th of Seaview ..	8134	22.2.24	177	13½	3,457	3·96	*137·04*	250	240, 191
R. J. Henry, Euroa	2	2	Jersey ..	My Luck of Ilford	11541	21.1.24	273	21	6,194	5·13	317·81	250	
				Antonette of Hillcrest ..	9448	13.3.24	272	21	8,064	5·48	441·93	350	292
J. A. Huffer, Gormandale	1	Nil	Jersey ..	*Dunalister Mannakin's Czarina*	10384	6.3.24	273	4½	2,203	6·16	*141·86*	300	244
J. Hutchinson, Somerville	3	3	Jersey ..	Dunalister Perrees Primrose ..	10422	30.1.24	273	24	7,483	5·65	422·86	350	
				Beauty 5th of Somerville ..	9413	14.2.24	273	32	9,938	4·39	436·43	300	258, 383
				Babs of Somerville	9412	25.3.24	273	42	15,799	5·34	843·27	325	347, 578
A. W. Jones and Son, Whittington, near Geelong	6	5	Jersey ..	Rose of Hillcrest	6017	28.1.24	273	24	7,494	5·31	398·05	350	267
				Junette of Hillcrest	7037	15.2.24	273	15	5,550	5·43	*301·22*	350	294
				Lady Grey 29th of St. Albans	14164	16.2.24	273	17½	5,328	5·81	309·45	200	
				Lady Grey 26th of St. Albans	14162	„	273	21½	6,281	4·99	313·32	200	
				Blanchette 5th of St. Albans..	10272	13.3.24	273	27	7,782	5·59	435·28	325	283, 346
				Lady Grey 27th of St. Albans	14163	17.3.24	273	14	4,557	5·41	246·62	200	
	9	6	Friesian	*St. Alban's Mary Ann* ..	Vol. 5	19.1.24	200	11	5,982	3·83	*229·08*	350	
				Lily of Craigneil	1022	20.1.24	273	29	10,498	4·31	452·01	350	338, 357
				Galatea Fayne Segis 2nd ..	205	27.1.24	273	46	14,083	3·33	468·67	350	
				Waituki Princess Abagail ..	1023	1.2.24	273	23	11,362	3·01	*341·85*	350	272, 305, 332
				Roycroft Inka Echo ..	1383	8.2.24	273	40½	14,403	3·49	503·02	350	
				Westmere Pontiac Magpie ..	Vol. 5	2.3.24	273	7	8,909	3·65	325·32	250	282
				Gaiety of Craigneil	1035	„	273	24	10,471	3·55	372·06	300	300, 360
				Buttermaid 2nd	1024	8.3.24	273	16½	7,677	3·61	*277·38*	350	311, 442, 319
				Cordyline Inka de Kol ..	1028	22.3.24	273	21	11,050	3·55	392·68	350	282, 401, 452

Standard Herd Test—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs.	
A. Joshua, Berwick	1	Nil	Jersey ..	*Violet of Hillcrest*	7048	12.1.24	273	14	5,917	5·13	303·54	*350*	314
J. F. Keating, Darnum	2	Nil	Red Poll	*Santa Clara*	557D	14.1.24	258	6	6,929	4·17	*288·62*	350	385, 332, 282
				Woodburn Duchess	357B	15.2.24	180	8	3,297	3·80	*125·18*	350	
D. Kilby, Paraparap	1	Nil	Ayrshire	*Bracken of Struan Park* ..	5176	12.1.24	273	7	5,738	3·94	*226·26*	350	
A. Kirby, Daylesford	2	Nil	Ayrshire	*Alice of Wattle Bank* ..	9680	9.1.24	273	12	5,159	4·14	*213·49*	225	
				Violets Queen of Wattle Bank ..	9687	,,	165	4	2,709	4·80	*130·13*	200	
Mrs. E. M. Lennie, Tongala	1	Nil	Jersey ..	*Pearl of Hill Crest*	6013	20.2.24	273	17	6,260	4·84	*302·70*	350	422, 345
Agricultural College, Longerenong	3	3	Ayrshire	Spray of Oakbank	5353	28.2.24	273	25½	9,142	4·26	389·23	350	
				Wistaria of Longerenong ..	12439	29.2.24	273	14	5,019	4·65	233·21	200	
				Holly of Longerenong ..	12432	1.3.24	273	21	7,053	4·07	286·88	200	
C. D. Lucas, Irrewarra	1	Nil	Ayrshire	*Berylan of Riccarton* ..	6493	21.2.24	273	16	6,197	3·72	*230·68*	350	294, 182, 204
H. Luxton, Whittlesea	2	1	Jersey ..	*Lily of Ferntree Vale* ..	9488	27.12.23	273	21	6,549	5·21	*341·00*	350	328, 394
				Sunbeam of Somerville ..	9418	5.1.24	273	19½	7,264	5·58	405·47	325	307, 386
C. G. Lyon, Heidelberg	2	2	Jersey ..	Silvermine 14th of Banyule ..	5220	7.2.24	273	27½	9,064	4·71	426·49	350	300, 383, 445, 376, 465
				Silvermine 24th of Banyule ..	11601	7.3.24	273	20	7,612	5·34	406·26	250	299

Standard Herd Test—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs.	
C. W. W. Macaulay, Rochester	2	1	Jersey ..	Rosebud of Taranah ..	11630	20.1.24	273	13½	4,277	6·58	281·28	225	234
				Honey of Wanalta	7164	13.2.24	273	19	4,976	4·94	*245·62*	325	269, 274
H. V. McKay, Sunbury	1	Nil	Ayrshire	*Virtue of Ayrbrae*	7565	6.2.24	222	11	5,255	4·29	*225·33*	300	188, 231
P. J. Maloney, Tongala	1	1	Jersey ..	Tiny Choice of Belgonia ..	11634	11.2.24	273	17	5,761	5·91	340·45	250	384
T. Mesley, Dalyston	4	3	Jersey ..	Mavis of Warenda	10348	1.1.24	273	10	4,796	5·79	277·49	250	
				Daisy 14th of Melrose ..	10518	22.2.24	273	10	4,937	6·05	*298·70*	300	279, 292
				Pibroch	5256	23.2.24	273	14½	9,394	5·75	539·90	350	440, 418, 469,
				Florrie 2nd of Warenda ..	14214	17.3.24	263	14	4,279	6·96	297·94	200	
Mrs. L. Orchard, Grahamvale, near Shepparton	1	Nil	Jersey ..	*Alice of Grahamvale* ..	5328	13.3.24	273	10½	4,422	4·82	*213·28*	350	252, 261, 245, 239, 193, 205
T. H. Payne, Kilmore	3	Nil	Red Poll	*Woodburn Tartar*	226AA	24.1.24	273	21	5,585	4·39	*245·39*	325	225, 149
				Plumstead Permain ..	219AA	2.3.24	273	20	7,601	4.35	*330·90*	350	273, 297
				Manor Tiarella	Vol. 3	3.3.24	273	10	4,492	4·39	*197·15*	225	
J. Phillips, Murraydale	2	1	Jersey	*Carnation of Ferntree Vale* ..	9637	5.1.24	241	¼	4,951	5·43	*268·61*	300	274, 341
				Empire 10th of Melrose ..	15033	25.3.24	273	14½	3,682	5·76	212·09	200	
F. Raggatt, Euroa	1	1	Jersey ..	Colina of Methven	12906	25.3.24	273	11	4,852	6·69	324·36	225	308

STANDARD HERD TEST—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs.	
J. D. Read, Springhurst	2	2	Jersey ..	Tulip 2nd of Springhurst ..	9667	14.3.24	272	27½	9,536	5·43	517·34	275	316, 278
				Boree of Springhurst ..	9661	3.3.24	273	19	7,637	4·81	367·42	325	279, 371
Red Cross Farm, Bundoora	1	Nil	Friesian	*Burnbank Princess Bonnie* ..	1211	2.1.24	240	9	4,075	3·94	*160·44*	200	
Miss Bruce Reid, Bundoora	1	1	Jersey ..	Jubilee Lotus	13770	2.2.24	273	17½	5,723	5·84	334·24	200	
A. A. Richardson, Warragul	2	2	Jersey ..	Chloe 2nd of Clarendon Eyre	11650	10.1.24	212*	10	3,490	7·22	252·01	250	
				Felicity of Clarendon Eyre ..	9575	20.2.24	240*	17	5,077	5·28	268·15	250	
C. L. Rigby, Lower Ferntree Gully	1	Nil	Ayrshire	*Gracie of Netherbrae* ..	10217	29.1.24	273	22	5,717	3·16	*180·85*	250	189
Miss S. L. Robinson, East Kew	5	4	Jersey ..	*Kyora Defender's May 3rd* ..	7380	9.1.24	268	10	4,926	5·42	*267·23*	350	255, 212, 263, 262
				Woodbine of Woodside ..	Vol. 12	21.1.24	273	11	4,294	5·65	242·52	200	
				Needle of Ruhbank ..	Not yet allotted	23.1.24	273	11½	4,453	6·31	281·16	250	189
				Betty of Woodside	11256	18.2.24	268†	11½	3,955	5·64	222·99	200	
				Luxury of Esperanza ..	Not yet allotted	2.3.24	267†	9	3,307	6·16	203·83	200	
W. P. Rogen, Tatura	1	1	Jersey ..	Jess of Clarendon Eyre ..	9576	30.12.23	273	20	6,938	4·75	329·69	250	
G. Rowe, Kardella	3	1	Jersey ..	*Rosette of Hill Crest*	10469	7.1.24	273	12½	5,495	4·59	*251·96*	350	246, 212
				Duchess of Welbourne ..	13779	12.12.23	273	13	4,882	4·99	243·74	200	
				Sweet Pansy 5th of Melrose ..	7400	16.1.24	273	13	4,944	6·39	*315·91*	350	245, 311, 362, 319

* Sold before completion of term. † Died before completion of term.

Standard Herd Test—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.	lbs.		lbs.	lbs.	
S. Russell, Tongala	1	1	Friesian	Springfield No. 9	1071	13.1.24	260*	39	14,227	4·04	574·74	300	357, 487
Agricultural High School, Sale	3	Nil	Ayrshire	*Gladsome of La Trobe* ..	8129	5.1.24	273	10½	4,468	4·26	*190·43*	250	167
				Young Madeira of La Trobe ..	4814	10.1.24	273	7	4,826	3·93	*189·64*	350	225, 240, 259, 191
				Madge of La Trobe	11362	12.1.24	273	4	4,779	4·18	*199·74*	225	179
W. A. Sandles, Mt. Best, near Toora	2	2	Jersey ..	Lady Betsy of Ferndale ..	9696	23.1.24	273	16	6,266	5·62	352·28	300	
				Rose of Franklin Park ..	13015	18.2.24	273	15½	3,904	5·85	228·37	200	
A. H. Schier, Kernot	8	1	Ayrshire	*Scotswood Sylvia*	10321	2.1.24	205	6½	4,029	4·82	*194·33*	225	213
				Bettsie of Inverleigh ..	10285	4.2.24	263	6½	4,530	4·21	*190·82*	300	213, 242
				Modesty of Inverleigh ..	5861	14.2.24	273	9	7,420	4·18	*309·88*	350	223, 247, 259
				Fine Quality of Gleneira ..	7711	14.2.24	260	17	4,797	5·51	*264·34*	350	187, 209, 262
				Scotswood Marigold ..	10304	18.2.24	273	8	7,134	3·97	283·49	250	269
				Scotswood Mayflower ..	10305	19.2.24	256	18	5,198	3·75	*194·73*	250	182
				Scotswood Super Quality ..	10319	2.3.24	273	5	3,236	4·42	*143·05*	200	
				Merline of Inverleigh ..	11363	5.3.24	273	13	5,548	5·10	*283·09*	300	196, 218
Mrs. D. Stark, Wando Vale, near Casterton	2	1	Jersey ..	*Coralloid of Comely Banks* ..	12237	31.12.23	273	9½	2,949	6·18	*182·30*	200	
				Thora of Jersey Meadows ..	11717	31.12.23	273	13½	4,489	6·44	289·28	200	
O. J. Syme, Macedon	2	2	Friesian	Bolobek Damsel	1125	16.1.24	273	25½	9,752	4·09	398·92	225	
				Bolobek Mab	1133	24.2.24	273	26½	8,203	3·63	297·79	200	
L. W. Thompson, Pakenham	1	1	Jersey ..	Meadow Sweet of Warenda ..	9567	14.1.24	273	26½	7,645	6·33	483·88	300	404, 439

* Re-calved prematurely.

Standard Herd Test—*continued.*

Owner.	No. completed Test.	No Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
								lbs.			lbs.	lbs.	
S. Trevaskis, Tongala	1	1	Jersey ..	Joybell 2nd of Ballara ..	11721	31.12.23	273	8	3,463	6·01	208·20	200	
A. Wallace, Bendigo	1	1	Ayrshire	Daffodil	9881	9.2.24	261	31	9,429	4·01	377·80	350	205, 387, 279
A. L. Walter, Little River	1	Nil	Jersey ..	*Bonnie 2nd of Tarnpirr* ..	7052	12.1.24	273	14	5,219	6·47	*337·62*	350	
Agricultural High School, Warragul	1	Nil	Red Poll	*Laranaga*	4880	29.12.23	218	4	5,599	4·00	*223·94*	350	199, 278
H. L. Webb, Sunbury	2	1	Ayrshire	Melody of Holly Green ..	11496	6.1.24	273	13¼	5,042	4·76	239·85	200	
				Mella of Holly Green ..	6952	8.1.24	258	5½	5,972	4·31	*257·12*	300	
J. Wills, Bacchus Marsh	2	Nil	Friesian	*Pomahaka Snowflake* ..	1138	10.2.24	273	19¼	7,720	3·47	*268·24*	350	260
				Springheld No. 8	1139	11.2.24	273	27½	10,567	2·66	*280·92*	300	
W. Woodmason, Oakleigh	3	3	Jersey ..	Graceful Duchess 19th of Melrose	7540	30.1.24	273	24	7,227	6·45	466·15	350	325, 404, 438, 433
				Graceful Duchess 31st of Melrose	14299	18.3.24	273	14½	5,012	6·16	308·93	200	
				Jessie 37th of Melrose ..	14360	27.3.24	273	13	4,696	6·18	290·26	200	

STALLION REGISTER, 1924-25,

Under the "Horse Breeding Act 1919."

Part III*.—Registrations prior to 31st August, 1924.

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
621	Safe Voyage ..	6	Light ..	D. Murchison ..	Katamatite
147	,, ,, ..	A	,, ..	V. Meyers ..	Lockwood
611	Sahara	A	Pony ..	E. A. Mahar ..	Kerang
857	Sailor's Knot ..	3	Draught ..	Mitchell & O'Brien	c/o Campbell & Sons, Bourke-street, Melbourne
234	Salient	A	Pony ..	R. A. Affleck ..	Warrnambool T.P.O.
406	Sam Huon ..	A	Light ..	J. P. O'Brien ..	110 Powlett-st., E. Melbourne
1163	Sandy's Fashion ..	5	Draught ..	E. Haines ..	Gerung
901	Santrel	A	Light	R. W. Storey ..	Murchison E.
944	Satellite Junior ..	A	Pony ..	Saunder Bros. ..	Yourang
169	Satellite's Pride ..	A	Light ..	R. Berry ..	Emu P.O.
73	Saturn	A	Pony ..	W. E. Daniel ..	Nagambie
1243	Scotch Avon ..	3	Draught ..	A. Strawhorn ..	Barfold
1254	,, Laddie ..	3	,, ..	W. J. Greaves ..	Lyndhurst
1058	,, ,, ..	3	,, ..	L. Carton ..	Laceby South
1033	,, Prince ..	3	,, ..	Evans Bros. ..	Redcamp, Moyhu
920	,, Thistle ..	3	,, ..	J. Bagnell ..	Mologa
1059	Scotland Again ..	3	,, ..	T. J. Witherow ..	Wangaratta South
321	Scotland's Bloom ..	A	,, ..	W. G. Parish ..	Horsham
994	,, Pride ..	2	,, ..	G. A. Tonisson ..	Box 176, Warracknabeal
684	,, Signet ..	A	,, ..	N. Ramsay ..	Prospect Farm Newbridge
910	,, Viceroy ..	A	,, ..	Todd & Allen ..	Willenabrina
557	,, Viceroy's First	5	,, ..	P. B. Miller ..	Katyil
463	,, Victory	4	,, ..	Mr. Peucker ..	Sea Lake
797	Scottie	A	Draught ..	T. Fullam, jun. ..	Torrumbarry P.O.
714	Scottish Laird ..	5	,, ..	T. Edson ..	Glenorchy
827	,, Peer ..	A	,, ..	D. Foubiston ..	Selkirk Hotel, Minyip
781	,, Prince ..	A	,, ..	R. D. Buckley ..	Lawloit
584	Scotty	2	,, ..	Cassidy Bros. ..	Ouyen
131	,, ...	A	,, ..	J. Roulston ..	Muskerry East
931	,, Chief ..	A	,, ..	F. B. Healey ..	Kaniva
1055	Scotty's Fancy ..	3	,, ..	W. J. Morton ..	Rochester
1177	Sea King	A	,, ..	A. McCready ..	Gnarwyn, Ondit
1170	Seacombe ..	A	Pony ..	E. G. Gibb ..	Sale
1253	Seisylt	5	,, ..	F. Keeble ..	c/o Mrs. Drake, Upper Beaconsfield

Part I. was printed in this *Journal* for January, 1925, and Part II. in the issue of February, 1925.

STALLION REGISTER, 1924–25—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
1108	Selkirk	A	Light ..	A. Scott ..	Elmore
715	Selsiam	4	,, ..	T. Edson ..	Glenorchy
995	Several	A	Thoroughbred	J. Boyd ..	Franklinford
997	Shandon Bells ..	A	Light ..	W. Morris ..	Ascot Vale-rd., Newmarket
425	,, ,, ..	A	,, ..	T. Long ..	Nhill
879	Shanter's Best ..	5	Draught ..	Rasheed & McDermott	Adelaide, S.A.
199	,, Pride ..	A	,, ..	G. A. Thompson	Lauriston Park, Kyneton
782	,, ,, ..	A	Pony ..	J. McIntosh ..	Gerang Gerung
599	Shepherd	4	Draught ..	W. N. Holmes ..	Rainbow
93	,, ...	A	,, ..	Warren Bros. ..	Stawell
146	Shepherd's Boy ..	A	,, ..	I. Kelly ..	Korong Vale
1127	,, Pride ..	5	,, ..	E. J. Black ..	Casterton
11	Sheriff Huon ..	A	Light ..	V. Thomas ..	6 Hope-street, Richmond
641	Shifty Dick ..	A	,, ..	F. McDonnell ..	Mooree
511	Siam	A	,, ..	W. S. Clark ..	Peronella Stud Farm, Koyuga
1212	Silver Claim ..	A	Thoroughbred	M. Hutcheson ..	Pine Grove P.O. via Mitiamo
1157	,, King ..	A	Light ..	E. D. Scown ..	Terang
754	Silverlight ..	A	Pony ..	R. J. Jarvis ..	Cudgewa
1226	Silver Prince ..	A	,, ..	J. W. Johnson ..	Meadow Creek, Carboora
109	Silverton	A	,, ..	J. Rogers ..	Allansford
701	Simon Again ..	5	Draught ..	C. T. Wallis ..	Lockwood
453	Sir Andrew ..	3	,, ..	T. Jess ..	Watchupga
320	,, Burnhead ..	A	,, ..	Boyd Bros. ..	Minhamite
755	,, Clyde	A	,, ..	S. J. Taylor ..	Lake Boga
355	,, Don Pedro ..	A	,, ..	J. McKee ..	Clarendon P.O.
43	,, Douglas Haig ..	A	,,	Mrs. J. Biddlecombe	Golf Hill, Shelford
261	,, Everest ..	A	,, ..	A. Ralston ..	Lucknow
223	,, Fabric ..	A	,, ..	Allitt Bros. ..	Diapur
1205	,, Frederick ..	2	,, ..	T. Thornton ..	Waaia
982	,, ,, ..	A	,, ..	A. H. Joiner ..	Tongala
1046	,, Garnet ..	A	Pony ..	R. Kennedy ..	Bass
319	,, George ..	A	,, ..	J. K. Russell ..	Barunah Plains, Hesse
756	,, Goulding ..	A	,, ..	L. T. Rash ..	5 Eyre-street, Ballarat
13	,, Harold ..	A	,, ..	G. Adams ..	Shepparton P.O.
295	,, Lowlander ..	A	Draught ..	F. H. Jolly ..	Gerang Gerung
30	,, Mac	A	,, ..	W. Blake ..	Rushworth
437	,, Regulus ..	A	,, ..	W. G. Clark ..	Sunbury
998	,, Richard 2nd ..	A	Pony ..	W. Henderson ..	Grassmere
976	,, Roderick ..	A	Draught ..	W. Byrne ..	Trentham
1054	,, Rupert ..	5	,, ..	G. Kelly ..	c/o Mailman, Rochester
988	,, Thomas ..	A	,, ..	W. H. Lyon ..	The Grange, Sale
638	,, Walter Burnside	4	,, ..	F. Schroeder ..	Murrayville
545	,, Wilfred ..	A	,, ..	A. J. Mackay ..	Coonooer Bridge

STALLION REGISTER, 1924–25—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
1146	Sir William ..	A	Draught ..	W. A. McClellan	Bungaree
933	,, William ..	6	,, ..	McQueen Bros. ..	Waubra
859	Slip Knot ..	3	,, ..	Exors. of late James Russell	Barunah Plains, Hesse
544	Solomon IV. ..	A	,, ..	C. H. Perkins ..	Rainbow
800	Some Style ..	A	Light ..	T. F. Armstrong	Campbell's Creek, via Castlemaine
543	Southern Lad ..	A	Draught ..	G. M. McKenzie	Pullut
59	,, Star ..	A	,, ..	J. Maher ..	Nyarraby, via Chillingollah
783	Southerton ..	A	Light ..	J. Kilcullin ..	Sea Lake
29	Sportsman's Hero ..	A	Draught ..	A. Kennedy ..	Arcadia
108	Springbank Lawrence	A	,, ..	W. H. Crawford..	Hamilton
880	Springdale ..	3	,, ..	H. Wileman ..	Sunbury
757	Springwood ..	A	Light ..	G. J. Vagg ..	Cobden
76	Squib	A	Pony ..	A. Robertson ..	c/o A. W. Hobbs, Koria, via Willaura
197	St. Aidan	A	Light ..	M. Cribbes ..	Faraday
399	St. Simon ..	A	Draught ..	G. J. Butler ..	Carisbrook
1131	Stamperland Star ..	4	,, ..	A. Gillis ..	c/o Newmarket Hotel, Race-course-road, Newmarket
1176	Standard	A	,, ..	J. G. Scott ..	Hopetoun
189	Stanley May ..	A	,, ..	G. R. Ladson ..	Mincha West
262	Starlight	A	Pony ..	J. Giles ..	Sunnyside, Bairnsdale
983	,, ...	A	Draught ..	S. H. Spriggs ..	c/o J. Fuller, Mitre P.O.
263	Stern Anchor ..	A	Thoroughbred	A. Noble ..	Bleak House, Birregurra
57	Stirling Castle ..	A	Draught ..	D. W. Bryce ..	Cowes, Phillip Island
975	,, Prince ..	A	,, ..	R. A. Cumming	Bull Bull, via Lake Charm
550	Stockart	4	,, ..	O. Olson ..	Box 56, Jeparit
935	Stockman's Lad ..	A	,, ..	R. E. Stewart ..	Bung Bong
264	,, ,, ..	6	,, ..	J. F. A. Schulz ..	Lake Hindmarsh, Jeparit
474	Stivious	5	Light ..	A. W. Lackman..	Murrayville
64	Straightaway ..	A	,, ..	T. Allen ..	Narrewillock
450	Strathvale ..	5	Pony ..	V. R. Griffin ..	Underbool
493	Style O.	A	Light ..	Wm. Barry ..	Heathcote
1102	Stylish Mac ..	3	Draught ..	J. M. Phillips ..	Congupna Roa
784	Sudbourne's Victory	A	,, ..	A. C. Head ..	Seymour
145	Suggestion ..	A	Thoroughbred	A. T. Heath ..	Warracknabeal
470	Sun Time ..	4	Draught ..	J. H. Thomas ..	Yatpool P.O.
608	Sun Star	A	Pony ..	J. T. Unwin ..	Spring Vale
400	Sunbury	A	Light ..	T. C. Nolan ..	Tarrawingee
1001	Sunnigyle ..	3	Pony ..	R. Trimble ..	Rutherglen
571	Sunnydale ..	3	Draught ..	D. L. Bodey ..	Jung
758	Sunny Simon ..	6	Light ..	A. R. Swan ..	Avenel
1152	Sweet Abbey ..	A	,, ..	N. Chamberlain	Morwell
1251	Swiffie	A	Pony ..	Mrs. A. Williams	Bunyip
132	Taffy	A	,, ..	A. W. McIntyre	Dunkeld

STALLION REGISTER, 1924–25—*continued.*

Cert No.	Name	Age.	Class.	Owner.	Address.
		Yrs.			
358	Taffy	A	Pony ..	H. Jarvis ..	Benambra, Omeo Plains
56	,, ...	A	,, ..	J. Sargent ..	Yanac
607	Take Bells ..	A	Light ..	J. Ferguson ..	Redesdale
606	Tam O'Shanter Bill	A	Pony ..	G. Gordon ..	Ellerslie
759	Tamie O'Groat ..	6	Draught ..	R. V. Colliver ..	Koo-wee-rup
760	Tatahu	A	Light ..	M. Stephenson ..	29 King-street, Fitzroy
65	Tax Payer ..	A	Pony ..	G. King ..	Scott's Creek
1016	Tenor Voyage ..	5	Light ..	F. Siebel ..	Thomastown
547	Territorial ..	A	Draught ..	R. M. Thomas ..	Devon N.
761	The Abbot ..	A	Light ..	A. B. Hamilton	Fish Creek
1123	,, Banker ..	5	Draught ..	A. Templeton ..	Coleraine
12	,, Bard ..	A	,, ..	L. J. Weatherly	Mortlake
686	,, Butler ..	A	Light ..	R. G. Balshaw ..	Karnak, via Goroke
1187	,, Colonel ..	5	Draught ..	McDonald Bros.	Mortlake
77	,, Design ..	A	Light ..	W. J. Carter ..	438 Barkly-st., St. Kilda
28	,, Factor ..	A	Draught ..	C. Bates ..	Dobie
1209	,, Fashion ..	A	,, ..	R. Dyson ..	Dromana
1248	,, Favourite ..	6	,, ..	W. Potts ..	Ellenbank
665	,, General ..	A	Light ..	D. Shelley ..	Bungaree
586	,, Globe ..	4	,, ..	J. Barker ..	4 Woolercott-st., Coburg
626	,, Joker ..	A	Pony ..	D. Chambers ..	Redesdale
318	,, Masher ..	A	,, ..	W. N. MacNicol	Casterton
884	,, Pedestrian ..	A	Light ..	J. A. Cochrane ..	Dunoon-street, Murrumbeena
1227	,, Premier ..	A	Draught ..	G. Taylor ..	Leichardt
1080	,, Retainer ..	A	Light ..	M. McGowan ..	Sea Lake
1203	,, Roster ..	5	,, ..	C. A. Leasee ..	Coleraine
15	,, Scot	A	Pony ..	S. Armstrong ..	"Killearnan," Torresdale-rd., Toorak
283	,, Starling ..	A	Light ..	S. Farrell ..	Stratford
160	,, Trick ..	A	,, ..	W. Mellington ..	c/o C. J. Lawless, Batesford
1035	,, Vanquisher ..	A	Thoroughbred	J. Doherty ..	Bungaree
916	,, Verger ..	A	Light ..	A. E. Bowman ..	Ebden
837	,, Voyager ..	6	,, ..	H. H. Nairne ..	c/o G. Tremellan, Ardmona P.O.
300	,, Warrior ..	A	Pony ..	H. Wilson ..	Wodonga
494	,, Yarra Chief ..	A	,, ..	J. Douthie ..	c/o F. G. Connibere, Launching Place
317	Thoughtful ..	A	,, ..	P. McIntosh ..	Ondit
1222	Tigo	5	,, ..	L. M. Murray ..	Lake Bolac
359	Tim Brigham ..	A	,, ..	J. C. Nicoll ..	Binney-street, Euroa
709	Timely Direct ..	5	Light ..	J. M. Cromie ..	Swan Hill
841	Titiroa Baron ..	A	Draught ..	A. Courboules ..	Cape Clear
401	Toby	A	Pony ..	A. W. Thompson	Hamilton
316	Togo	A	Draught ..	H. Currie ..	Joel Joel
762	Togo's Chief ..	A	,, ..	J. Hefferman ..	Kononwootong, Coleraine

STALLION REGISTER, 1924–25—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
763	Tom Thumb ..	A	Pony ..	W. F. Eichler ..	Chillingollah
426	,, Walton ..	A	Draught ..	Cameron & McKenzie	Warracknabeal
315	Tommy	A	Pony ..	Boyd Bros. ..	Minhamite
1202	,, Dodd ..	5	,, ..	,, ,, ..	,,
1039	,, Huon ..	A	Light ..	J. Watkins ..	Euroa
860	Top Score ..	3	Draught ..	T. W. Irvine ..	Yarra Glen
486	Torfrid	A	Thoroughbred	D. Rogers ..	Boolara P.O.
195	Toy Bells	A	Light ..	J. Rutherford ..	Murtoa
222	,, Land ..	A	Pony ..	J. Burke ..	Muskerry East
785	Tra George ..	A	Thoroughbred	James & Wall ..	Leongatha
764	Tracey Alto ..	A	Light ..	E. Rash ..	Box 67, G.P.O., Ballarat
1109	,, Voyage ..	6	,, ..	Mackin Bros. ..	Korong Vale
314	Tramore	A	Thoroughbred	McDonald Bros.	Mortlake
765	Trelawney Time ..	A	Draught ..	R. H. Larcombe	Mt. Moriac
585	Trelawney's Pride ..	3	,, ..	J. Nairn ..	Box 44, Ouyen
1053	Tremenheere Craig ..	3	,, ..	C. N. Davies ..	Tremenheere, Rochester W.
805	Tresco	A	Light	A. E. Bowman ..	Bethanga Park, Ebden
572	True Blue.. ..	5	Draught ..	C. S. Maddern ..	Kaniva
1000	,, ,, ..	3	Light ..	W M. Pearce ..	Wahgunyah
464	,, Steel ..	A	Pony ..	A. Young ..	Rathscar
402	Trump	A	,, ..	A. W. Thompson	Hamilton
427	Truro	A	Light ..	J. E. Light ..	Quantong
710	Trustworthy ..	2	Pony ..	S. Ramsay ..	Swan Hill
274	T. T.	A	Thoroughbred	C. Thompson ..	Kulkyne Stn., via Euston, N.S.W.
1250	Tuxedo Voyage ..	5	Pony ..	M. E. Towt ..	Garfield
1100	Typical Voyage ..	4	Light ..	W. B. Harris ..	Cobram
692	Udale	A	Draught ..	J. Holdsworth ..	Jung Jung
438	,, Jack ..	5	,, ..	P. O. Middleton..	Carron
281	Unit	6	Pony ..	B. Rogers ..	Mepunga E.
705	Utah	3	,, ..	L. Strickland ..	Kanya P.O.
951	Valmond	A	Light ..	S. J. Cooper ..	Piangil
667	Valmour	4	Draught ..	R. Hetherington	c/oYoung Bros., Horsham
804	Vanguard ..	A	,, ..	G. & W. Lord ..	Flynn
798	Varco	A	Thoroughbred	W. McMecken ..	Kerang
107	Venerror	A	Light ..	J. C. Wallis ..	Miram
573	Vice Regal ..	4	Draught ..	W. G. Parish ..	c/o Wilson & Bolton, Horsham
711	,, Royal ..	5	,, ..	Mrs. I. B. Walker	Warwick Stud Farm, Swan Hill
897	Viceroy Yet ..	3	,, ..	C. Seisfield ..	Rainbow
265	Viking	A	Light ..	A. G. Turnbull ..	Winton
370	,, of Methven ..	A	Pony ..	Mrs. Maclellan ..	241 Dandenong-rd., Windsor
1225	Volunteer ..	A	,, ..	T. B. Waters ..	Corryong
313	Waironga Prince ..	A	Draught ..	G. W. Fielding ..	Watchem
456	Waironga's Model ..	3	,, ..	J. Yetman ..	Turriff
1252	Waituna	4	,, ..	S. A. Greaves ..	Narre Warren
719	Wakapero ..	5	,, ..	G. E. Jenner ..	Kerang E.

STALLION REGISTER, 1924–25—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
786	Wakepan	A	Light ..	J. Wood ..	Reid's Creek, via Beechworth
512	Wallace Park ..	3	Thoroughbred	F. H. Walsh ..	Melton South
1195	War Hawk ..	3	Pony ..	G. Telford ..	Beech Forest
168	Warrigal	A	,, ..	S. S. Baulch ..	Orford
377	Watch Me.. ..	2	,, ..	Mrs. Maclellan ..	241 Dandenong-rd., Windsor
487	Wee Jim	A	,, ..	J. R. Kettyle ..	Wesley Hill, Castlemaine
1140	,, Key	5	,, ..	R. Kirkwood ..	Byaduk North, via Hamilton
1230	Welcome Abbey ..	A	Light ..	J. Button ..	112 Crompton-st., Ballarat
672	,, Bells ..	A	,, ..	T. J. Splatt ..	Weering
280	Welsh Flyer ..	A	,, ..	P. J. Reid ..	Milawa
133	,, ,, ..	A	Pony ..	F. Irving ..	Tyrrell Downs
945	,, ,, II. ..	A	,, ..	J. Williams ..	Nalinga, via Dookie
802	Weralte	A	,, ..	A. E. Bowman ..	Bethanga Park, Ebden
488	Westmont.. ..	A	Light ..	Wm. Hay ..	Warrion P.O.
961	Weybridge ..	6	Thoroughbred	F. E. Robins ..	Maffra
828	What Oh	A	Pony ..	R. J. Hill ..	Victoria Farm, Grovedale
360	White Star ..	A	Light ..	G. Kelly ..	c/o Mailman, Rochester
661	,, Stockings ..	A	,, ..	Munro Bros. ..	Walpeup
600	Widgiewa Belmont	4	Draught ..	C. H. Perkins ..	Rainbow
788	,, Cavalier ..	A	,, ..	A. Gordon ..	Broughton
1246	,, Edward ..	5	,, ..	W. G. Down ..	Koonda P.O.
1052	,, Fashion ..	5	,, ..	W. L. Oliver ..	Diggora West
766	,, Ivo ..	6	,, ..	W. G. Wilkinson	Yarrawonga
1078	,, Marshall ..	5	,, ..	J. Christie ..	Katunga
196	,, Sapper ..	A	,, ..	F. J. J. Schultz	Cowangie
9	,, Stephen ..	3	,, ..	C. Hewitt & Sons	Werrigar East
1038	Wigton Again ..	A	,, ..	C. Murphy ..	Oxley
943	Wigtonshire ..	A	,, ..	J. Cobain ..	Sale
134	William Direct ..	6	Light ..	S. Richards ..	Ballarat
307	William of Orange ..	A	Thoroughbred	A. J. Gray ..	3 Fletcher-street, Essendon
477	,, Sportsman	4	Draught ..	W. A. Dehnert ..	Ballan
1462	,, Wallace ..	3	,, ..	H. E. Taylor ..	Pier Millan
581	Willie	3	,, ..	W. H. Allen ..	Broughton
787	,, Craig ..	6	,, ..	G. Oxley, jun. ..	Gre Gre North
1030	Wiltshire	A	Light ..	C. Wood ..	Minyip
923	Windlesham ..	A	Thoroughbred	W. Hillmann ..	Queen-st., Bendigo
861	Winning Hit ..	3	Draught ..	Mitchell & O'Brien	c/o Campbell & Sons, Bourke-st., Melbourne
681	Winsome Chief ..	A	,, ..	Peterson & Bourchier	Kellalac
143	Winter Wild ..	A	Light ..	A. Ferguson ..	c/o Coghlan & Boase, Tattersall's, Ballarat

STALLION REGISTER, 1924–25—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
904	Winteriga ..	A	Thoroughbred	W. Coe ..	Coleraine
1029	Wizard Junior ..	A	Pony ..	J. A. Goodwin ..	Wunghnu
312	Wonder	A	,, ..	Wm. McEvoy ..	Alexandra
311	Wonga	A	Light ..	Emily Parish ..	Green Park, Horsham
94	Woodland's Beauty	A	Pony ..	E. Fulton ..	Green Park, Horsham
188	,, Dandy	A	,, ..	W. Funcke ..	Laen, via Minyip
1	Worthy Mac ..	5	Draught ..	J. Elliott ..	Kyabram
485	Wotan	A	Thoroughbred	Dickinson Bros...	Albert-st., Sebastopol
27	W. W. Estell ..	A	Light ..	J. Hannah ..	Donald
881	Yarraview Benmore	4	Draught ..	A. E. T. Payne ..	Lilydale
1166	Yarrawaak ..	A	Light ..	F. D. Macdonald	Horseshoe Bend, Terang
374	Yeneda	A	Thoroughbred	D. Hutchison ..	Yan Yean
1037	Young Albyn ..	A	Draught ..	J. Watkins ..	Euroa
492	,, Badaween ..	A	Pony ..	F. Shaw ..	Wycheproof
911	,, Brigham ..	A	,, ..	W. J. Craig ..	Cobden
882	,, Buchlyvie ..	4	Draught ..	G. Burrows ..	Tasmania
266	,, Clydeside ..	A	,, ..	H. Jager ..	Swan Hill
173	,, Comet ..	A	Pony ..	T. Adkin ..	Korumburra
491	,, Coronation ..	A	Draught ..	G. Pitt ..	Jeparit
310	,, ,, ..	A	,, ..	W. J. Bennett ..	Cannie Railway Station
801	,, Croydon ..	A	,, ..	D. Blair ..	Terrappee
829	,, Cymra Bach..	A	Pony ..	G. N. Holbrook	Berriwillock
221	,, Dan ..	6	Draught ..	J. C. R. Tonkin	Mt. Jeffcott
799	,, Dandy's Pride	A	Pony ..	J. W. Powell ..	Beeac
830	,, Flashlight ..	A	Draught ..	T. Rawson ..	Bingo, Omeo P.O.
924	,, Ginger ..	A	Pony ..	W. M. Bell ..	Camperdown
767	,, Hero ..	A	Draught ..	J. Branson ..	Lake Cooper
267	,, Ki Ki ..	A	Pony ..	T. Robertson ..	Moyne Falls, Macarthur
624	,, Linkwood ..	A	Draught ..	J. H. Peverill ..	Charlton
1183	,, Lord Lyon ..	A	,, ..	Chamberlain & Ritchie	Morwell
1235	,, Lymney Champion	5	,, ..	W. H. Penaluna	Boolarra
269	,, McLeish ..	A	,, ..	J. Charlton ..	Stony Creek
1026	,, Major ..	A	,, ..	C. Gould ..	Tatyoon P.O.
277	,, Nailstone ..	A	,, ..	J. J. Nulty ..	Walpeup
361	,, Repeater ..	A	,, ..	R. N. Johns ..	Danyo
239	,, ,, ..	A	,, ..	A. W. Lackmann	Murrayville
106	,, Royal Oak ..	A	,, ..	H. Walker ..	Merbein
937	,, Shepherd ..	4	,, ..	B. A. Tucker ..	Horsham
489	,, ,, ..	A	,, ..	G. Chapman ..	Minyip
675	,, Simon ..	4	,, ..	L. Tognolini ..	Sandon
690	,, St. Albans ..	A	,, ..	J. McCormack ..	Roseberry East
198	,, Starlight ..	A	Light ..	W. Regan ..	6 Montgomery-st., Moonee Ponds
1028	,, United Prince	A	Draught ..	W. G. Young ..	Neerim
172	,, Yelretso ..	A	Light ..	M. Ford ..	Maryborough

REMINDERS FOR APRIL.

Sheep.—Merino and fine cross-bred ewes, if mated early (November-December), will lamb from now on. Particularly will this apply to early shorn ewes joined in the north of the State, as they have a natural tendency to take the rams early. These fine-wooled ewes, if in lamb to a Lincoln, Romney Marsh, Shropshire, Dorset Horn, English and Border Leicester, or Suffolk may have trouble at lambing. Close attention should be given morning and evening during the lambing period, with a view to avoiding losses in both ewes and lambs. Heavy-wooled ewes cast easily, and need constant attention. Crutching is usually undertaken this month, and a safe rule to follow is to have all ewes that are to lamb crutched one month before lambing. Lambing is usual (considering the varied conditions of the different districts of this State) from March to September, but flock owners should arrange their lamb-dropping date to suit their particular country. True, they have no control over the season, but they would be wise to strike an average, considering the question of feed and water. If ewes are attentive mothers any deaths of lambs after the flock owner has given all the reasonable practical attention possible are better dead, as they would be probably poor culls if saved by more expensive treatment and cost. Foxes, eagle hawks, and stray dogs are often the cause of losses at lambings and should be guarded against where possible. Give purgative drenches at first sight if ewes appear ill in any way. Ewes after difficult parturition or retention of after-birth can often be saved by flushing out with ½ oz. of lysol to 3 parts of warm water. Fresh pasture, sown grasses, or green crops should be reserved for ewes with their lambs a few days after lambing. Marking of the lambs can be undertaken one week after birth, but it is usual to wait for about two to three weeks after the first lambs are dropped before having a general marking. A second marking at about six weeks usually completes the operations in this direction for the flock. In districts where conditions make a second dipping necessary, see that it is done before the weather becomes too unsettled, and certainly in the case of lambing ewes, well before or after lambing. Rams should be drawn from ewes mated in December and early February, usually six to eight weeks after joining.

Cattle.—As the nights become colder the dairy cows should be rugged. The rugs should be removed in day-time when the shade temperature reaches 60 degrees. If new grass is plentiful, give a ration of hay or straw, whole or chaffed, to counteract the purging effects of young grass. It will be found profitable to give a few pounds of bran, crushed oats or pollymeal in addition to other food to all cows giving a fair quantity of milk. Algerian oats should be sown on suitable land for grazing off in the winter. Sow a mixture of oats, rye, and tares or peas for winter fodder or to fill silos. Irrigated lucerne may be scarified in autumn, Algerian oats sown, and in this way good feed provided for cows in winter. Only exceptional cows or those required for city milk supply should be served between now and July. Within the next two or three months is the best time for cows to calve, as they will pay to feed through the winter, give the best returns for the season, and be dry when the feed is dry and at its worst. Calves should have lucerne hay or crushed oats when grass is not plentiful. Take care that salt lick previously recommended is available. One or two pounds of linseed cake or meal given daily should be found beneficial. In addition to its feed value, the oil in the cake or meal will counteract the effect of dry feed, which is liable to cause impaction.

Pigs.—Sows not already served should be put to the boar. Supply all pigs with plenty of bedding, and see that sties are warm and well ventilated. Supply sows liberally with grain. Castrate young boars as early as possible. Pigs should be highly profitable now, as pork is very dear. Rape, barley (especially skinless), oats, &c., may be sown for grazing during winter.

Poultry.—Soft food aids moult; add a teaspoonful of linseed to each bird's ration once daily. The more exercise the hens get the better they moult. The mush is mixed with one packet of Epsom salts to twenty birds once a week. Keep a sharp look out for chicken pox. Forward pullets should now be in their winter quarters with plenty of scratching litter, and fed liberally—including ration of animal food, dried milk, or separated milk. Grit, shell, and charcoal should always be available. Feed some succulent green food after the grain food at night.

GREEN FEED FOR WINTER

WINTER FODDER CROPS

Somner's Special Mixtures

No. 1—Rye, Dun Peas, Golden Tares (Vetches), Barley or White Oats, mixed quantity, sufficient for 1 acre - - - - - - - **15/6**

(Five-acre lots, **14/6** per acre).

No. 2—Oats, Cape Barley, Golden Tares, Tick or Horse Beans, Partridge, Dun, or Blue Peas, mixed quantity, sufficient for 1 acre - - **18/6**

(Five-acre lots **17/6** per acre).

Either of these mixtures, if cut or pastured in Winter and ploughed under in August, will make a good preparation for Lucerne to be sown in August or September.

The growing of Summer Fodder Crops imposes a tax on the resources of the soil, and as a restorative when ploughed in, the above mixtures are specially recommended. The crop comes away rapidly and makes steady headway during Winter, giving a good quantity of excellent fodder.

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— RAPE —

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A highly nutritious and palatable green feed. **Will fatten 3 more sheep per acre than any other kind. Will not taint the milk** Sow 4 to 6 lb. per acre in drills, or 8 to 12 lb. broadcast. **10d.** lb.; **84/-** cwt.

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English Grown (true) 8d. lb.; 65/4 cwt.
N.Z. Grown, 7d. lb.; 60/- cwt.
White Mustard (for sowing with rape) 1/6 lb.; 150/- cwt.

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CLOVER

The Great Winter Fodder

Valuable for its green or dried fodder, and as a Winter Soiling Crop for Orchards, Vineyards, &c., on irrigated land. At least four cuttings can be made during a season. Sow 8 to 12 lb. per acre in drills, or 20 to 30 lb. broadcast.

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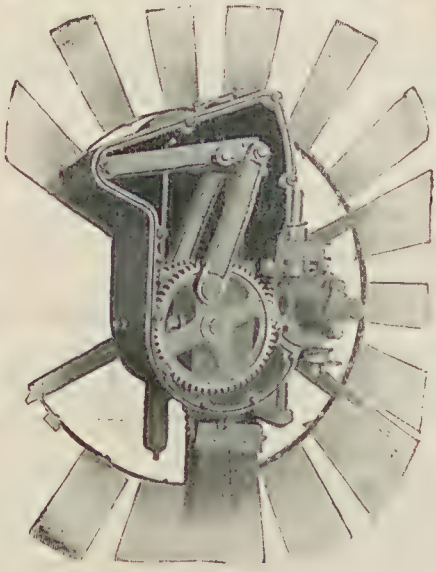

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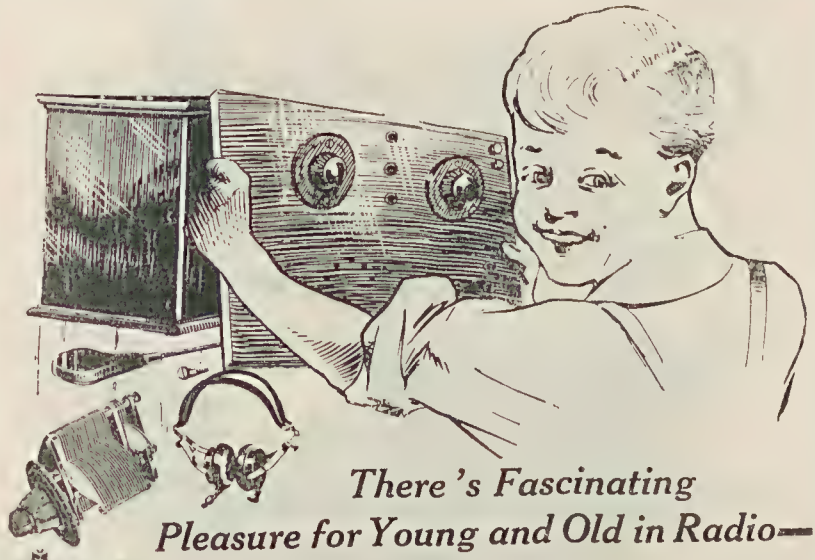

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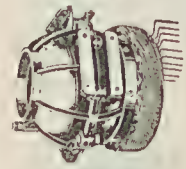

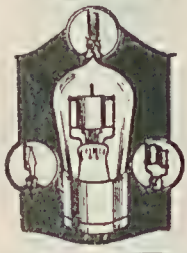

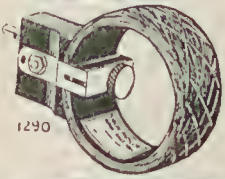

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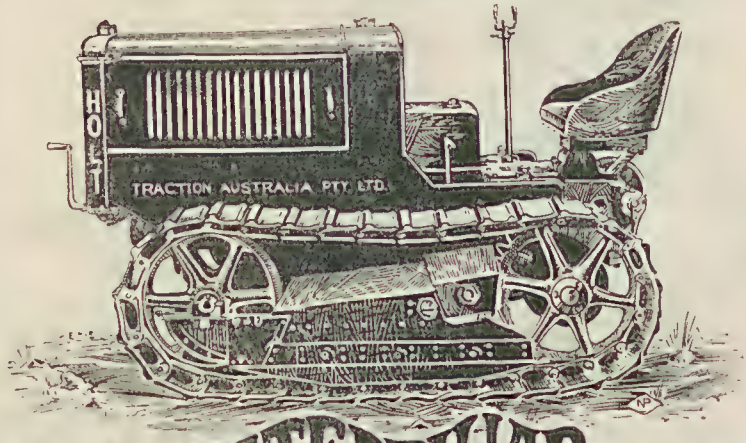

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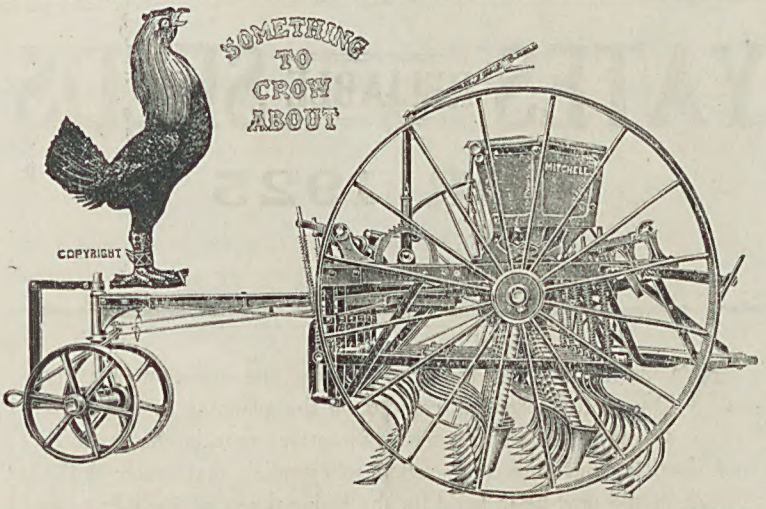

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FOR 1925

AS the last month of the year slips by, the attention of every thoughtful farmer is centred on the planning of the New Year's work. Autumn is such an important time in the majority of districts, and early preparation so essential, that much of the work should now be in hand for the laying down of such lines as Pasture Grasses, Lucerne, and Clovers, and early green fodder crops like Oats and Barley. Sowing should take place during February and March.

With regard to Seed Supplies, those of our readers who have dealt with us in the past know that Yates Reliable Seeds give the cleanest, heaviest, and surest crops, they know that our Seeds give them far greater value for money than "cheap" seeds, and that the slight extra cost of Yates Recleaned and Tested Farm Seeds is more than repaid by the undoubted superiority of quality, growth, and strain. For 1925 we shall exercise the same scrupulous care in the selection, testing, and recleaning of Yates Reliable Seeds that has made them the choice of the leading agriculturists all over the Commonwealth.

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DEPARTMENT OF AGRICULTURE, VICTORIA

Red Poll Dairy Herd

The Department has now completed the orders for calves that were booked ahead of calving when the advertisement was withdrawn; consequently the booking of orders for bull calves from the forthcoming calvings has now been resumed.

BULL CALVES are sold for delivery at a month old at prices based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter ***fat*** yielded. Thus a calf from a cow with a 400 lbs. butter fat record is sold for 20 guineas, one from a 300 lb. butter fat cow for 15 guineas, and so on. Bull Calves *ex* heifers on their first calf are sold for a set price of 10 guineas.

(For Record of Yields of dams see Red Poll Herd Book.)

The Bulls in Use include—

VICE REGAL (95 A.A.)

Sire: Nicotine (69 A.A.). Dam: Velveteen (Imp.) 22875 (2 A.A.).

VICTORIA VOLCANO (322 A.)

Sire: Nicotine (69 A.A.) by Acton Dewstone (imp.) 9524 (4 A.A.).

Dam: Tonga (253 A.) by Honingham Archbishop (imp.) 9702 (48 A.A.).

Tonga's butter fat yields for 6 successive lactation periods are as follow:—1916, 341 lbs.; 1917, 398 lbs.; 1918, 419 lbs.; 1919, 479 lbs.; 1920, 428 lbs.; 1921, 562 lbs.

BELLIGERENT (Imported) 11096 (8 A.A.)

Dam's Record (1st milking) 7144 lbs. milk.

Dam's Dam's	,,	14533 lbs. milk	...	4	years	average	12871	lbs. milk.
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Sire's D. Dam's	,,	9510 ,,	...	12	,,	,,	8033	,,
G. Sire's D. Dam's	,,	10215 ,,	...	7	,,	,,	9386	,,
G.G. Sire's D. Dam's	,,	12565 ,,	...	10	,,	,,	8853	,,
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Inspection of the Herd is Invited.

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